

20. Library Administration

20.1 ECS Library Administration Overview

The ECS Library Administration is provided by several departments within the ECS project through the combined resources of Data Management (DM), Configuration Management (CM), and the System Monitoring Center (SMC). Library Administration includes (1) production, maintenance, and distribution of baselined ECS documents, (2) delivery of approved commercial-off-the-shelf (COTS) software and documentation and non-contractual documentation to the DAACs and other Government facilities; and (3) DAAC specific production, maintenance, and distribution of documents which, due to a more timely need for document updates, are produced locally and are tailored to reflect individual DAAC needs and configurations. The DAAC specific updates are eventually incorporated into ECS approved documents. There are three web sites that function as electronic distribution points for the approved data and documents. These web sites are maintained by DM, CM and SMC respectively: The ECS Data Handling System (EDHS), the ECS Baseline Information System (EBIS), and the System Monitoring Center (SMC). All of these processes are discussed in more detail in this Library Administration section.

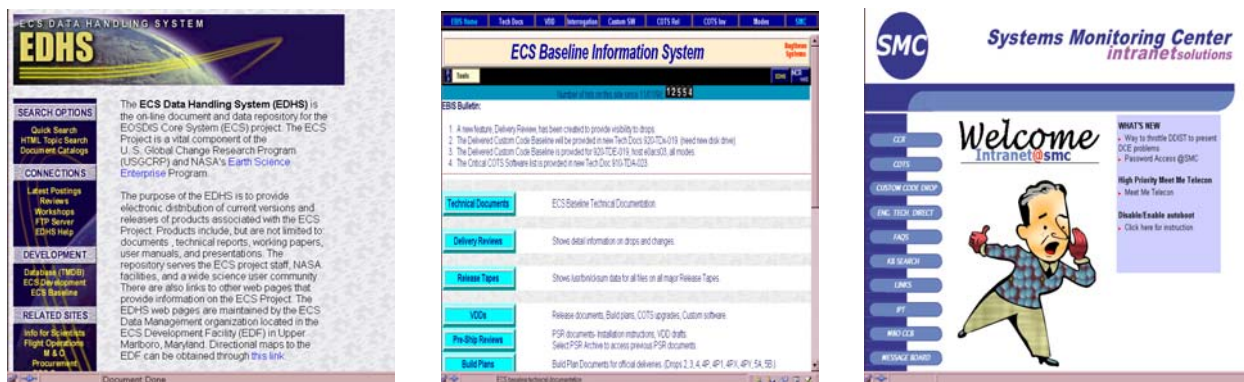


Figure 20-1. The EDHS Home Page, the ECS Baseline Information Home Page, and the System Monitoring Center Home Page

20.1.1 Data Management (DM)

DM is the focal point for establishing and advancing all project document/data management activities. In this regard, DM works closely with all ECS offices to provide efficient and cost-effective distribution, storage, maintenance, and retrieval of these data. DM is responsible for maintaining ECS data/documentation which includes documents under control of the ECS

Change Control Boards (CCB) and subordinate CCBs. DM's responsibilities encompass three functional areas: (1) Data Requirements refers to the deliverable documentation specified in the Contract Data Requirements List (CDRL) as well as other data items that document the ECS Project; (2) Data Control activities focus on the efficient archive, storage and maintenance of materials that support such things as milestone reviews, technical papers and white papers; and other pertinent data such as contract correspondence, progress reports, and background information; and (3) Data Support includes the preparation of documentation for publication. This includes format editing, document coordination, graphics, layout, and reproduction. The Document Coordination staff is responsible for all activities required to prepare CDRLs and other documentation required by the contract. To make documentation readily available, DM has established an electronic distribution via the World Wide Web through the EDHS, (<http://edhs1.gsfc.nasa.gov>).

20.1.1.1 Authoring Documents

ECS CDRLs and other documents are authored by project personnel using existing tools and templates to ensure consistency and completeness with customer requirements. A standard set of software applications are used across the ECS Project. The use of this common set of production tools by both the development personnel and the documentation staff reduces redundant activities such as key strokes and art preparation.

20.1.1.2 Formatting Documents

To ensure compliance with customer standards and to promote consistency and ease of use, a standard tool kit of document formats or templates was developed by DM. These templates are located on the ECS Internal Server portion EDHS web site under the Data Management Document Templates and Guidelines, and are used by authors to develop CDRLs and other types of documents. After a document is written or updated by an author, it is then forwarded to DM for further processing. DM assigns the document a unique document number and reviews the document for completeness and format accuracy.

20.1.1.3 Posting and Retrieval of Documents

After documents are formatted and reviewed by DM, they are reviewed and approved by the appropriate Configuration Change Board (CCB) and other reviewers as required. Approved documents, which are not otherwise restricted, are posted to the EDHS. The EDHS web site provides on-line search and retrieval of ECS documentation and is the primary repository of information maintained by the ECS Project. DM maintains the EDHS web pages and is responsible for the integrity of all posted documentation.

20.1.1.4 Distribution and Maintenance of Documents

ECS CDRLS and Required Documents are maintained by DM, for the life of the project. A Baseline change to an Earth Observing System Data and Information System (EOSDIS) approved documents is accomplished through a document change notice (DCN) or revision. Documentation produced by the project is distributed internally and/or to the customer.

Dissemination includes printed hardcopy and/or electronic posting as indicated in the preceding section.

20.2 Configuration Management (CM) Overview

The ECS CM Office requirements and objectives in support of ECS Library Administration are to maintain and publish ECS Technical Baseline Documentation on the ECS Baseline Information System (EBIS), located on the following url: (<http://cmdm.east.hitc.com/baseline/>) or (<http://pete.hitc.com>).

20.2.1 Configuration Management (CM)

The ECS Technical Baseline documents are updated when the M&O CCB approve CCRs, which pertain to the DAACs. This naming convention is defined in 910-TDA-001, Baseline Specification Document.

The EBIS contains different types of documents within the ECS Project, such as:

1. Technical Documents, posted as CCRs are approved by CCB
2. Delivery Reviews, shows detail information on drops and changes
3. Release Tapes, Shows /us/bincksum data for all files on all major Release Tapes.
4. VDDs, Release documents, Build Plans, COTS upgrades, Custom Software.
5. Pre-Ship Reviews, PSR documents – Installation Instructions, VDD drafts.
6. Build Plans
7. Test Executables
8. ECS Configuration
9. Operational Modes
10. COTS Status
11. SMC WWWBoard

20.2.1.1 Posting/Retrieval of Documents/Software from Configuration Management Server

Information being disseminated by <http://cmdm.east.hitc.com/baseline/> must have been approved by the CCB.

Documents are posted in PDF format, and are posted in accordance with 905-TDA-001. Documents are posted on the EBIS with the current revision level for that document. If there is any question relating to any document on the EBIS page, contact the CM Administrator listed on the WEB Site page.

20.2.1.2 ECS Software Library Maintenance

The ECS Software Library is responsible for controlling and tracking all approved COTS software for the project. CD's, tar files, and other media is disseminated to the SMC or DAACs depending on the type of COTS software. The Software Library maintains previous versions of COTs products and has the responsibility to ensure that only COTs products have an approved CCR before release of the product.

20.3 System Monitoring Center (SMC) System Overview

The SMC system requirements and objectives in support of ECS Library Administration are overall system performance monitoring, coordinating, and setting system wide policies and priorities

20.3.1 System Monitoring Center (SMC) System

The SMC servers are the distribution points for:

1. Staging area and distribution for ECS Custom/COTS Software deliveries.
2. Medium for the distribution of non-contractual documentation to the sites. Documents such as README file, COTS electronic instructions, Technical white papers, CCRs, NCR Workaround instructions, database scripts repository etc....
3. Maintains copies of all deliverables that include, but are not limited to, binaries, executables, Toolkit deliveries, test data, NCR workarounds, README files, general instructions, etc.

Information can be retrieved from the SMC by accessing the Website. The URL is as follows (<http://m0mss01.ecs.nasa.gov/smc/>)

20.3.1.1 Posting/Retrieval of Documents/Software from System Monitoring Center (SMC) Server

The Systems Monitoring Center Staff will be responsible for the dissemination of information provide to the SMC. Information can come from a variety of sources such as EDF, DAACs, and others. The submitter will notify the SMC staff (via phone, pager, or e-mail) that the files are ready. The software and the supporting documentation can either be pushed to the sites or pulled by the sites for installation

20.3.1.2 Authoring Documents

A Systems Operation Support (SOS) sustaining engineer will create all source material (text, graphics files, etc.) per CDRL/DID preparation instructions and be accountable for the accuracy of its content. Local DAAC production personnel will assist the author by providing word-processing and graphics support such as templates and fonts.

20.3.1.3 Formatting Documents

All documents submitted to the SOS Book Boss by a SOS Engineer staff member should be in Microsoft Word format. These DAAC specific documents are numbered and controlled locally to include a review for completeness and format accuracy.

20.3.1.4 Submitting Documents

All documents submitted to the SOS Book Boss should be in soft copy. Soft copy should be sent via electronic mail as an attachment .

20.3.1.5 Requesting Documents

Requests for documents may be made by telephone, in person, or by electronic mail.

20.3.1.6 Metadata Maintenance

See Chapter 10 Metadata Administration.

20.4 On-Site Documentation Overview

On-site documentation requirements and objectives in support of ECS Library Administration are to generate site specific documentation in accordance with program standards and conventions for format storage and control. SOS resources will be kept informed and utilized as appropriate

20.4.1 On-Site (DAAC Specific) Baselined (CDRL/DID) Document Production, Maintenance, and Distribution

The on-site documentation activities are described in the paragraphs below.

20.4.1.1 Authoring Documents

The assigned engineer will create all source material (text, graphics files, etc.) per CDRL/DID preparation instructions & be accountable for the accuracy of its content. The DAAC's Book Boss will oversee the development of the documents and act as the interface between Local DAAC production personnel and the DAAC's assigned engineers. Local DAAC production personnel will assist the author by providing word-processing and graphics support such as templates and fonts.

The DAAC Book Boss can request the assistance/assignment of a SOS Book Boss to assist in the development of a document. In this case, the SOS Book Boss can serve as the focal point for editing, publication and dissemination of the document. The SOS Book Boss can also draw on M&O resources to assist in writing sections as needed or requested by the DAAC Book Boss.

20.4.1.2 Submitting and Formatting Documents

All documents submitted to the DAAC's Book Boss should be in MS Word format and also, if possible, in hard copy. Soft copy should be sent via electronic mail as an attachment and hard copy could be hand delivered to SOS Library. These DAAC specific documents are numbered and controlled locally to include a review for completeness and format accuracy.

20.4.1.3 Requesting Documents

Requests for documents may be made by telephone, in person, or by electronic mail.

20.4.1.4 Metadata Maintenance

Science Coordinator technically interfaces with the Science Computing Facilities by updating Interface Control Documents (ICD).

20.4.1.5 Maintenance of Baselined ECS Documents in Baseline Manager Tool

The Baseline Manager Tool (XRP-II) will be used to record the change history and updates to post current revisions to the Baselined ECS documents. This tool will also be used to provide the Master Index for the SOS Library.

20.4.1.6 Document Metadata Insertion Subscription

The SOS Library is the repository for all SOS Maintained documents (both hard copy and electronic). COTS documentation will be physically located in the library in it's own section. Documentation available on CD-ROM will be located in a separate cabinet. Documentation available on-line will be posted in the SOS Library and on the Document Management Server.

20.5 Systems Operation Support (SOS) COTS Overview

The SOS system requirements and objectives in support of ECS Library Administration are to enhance and streamline documentation activities related to operations and DAAC specific activities.

20.5.1 SOS COTS Document & Software Maintenance

The activities associated with documentation and software maintenance are described in the sections below.

20.5.1.1 COTS Library Database

The COTS library database designed in Microsoft Access is a means of controlling and maintaining Commercial Off the Shelf (COTS) documentation and software residing in the library. SOS personnel have access to the library database through the Document Management Server (DMS). The database enables SOS personnel to locate and retrieve document information. By using any of the available fields in the database, the user has the ability to search the contents of it. The library database search provides the user adequate information to

retrieve the most current version of a document. Requesting COTS documentation may also be made via the database in which the SOS Librarian will receive notice as soon as the request is sent.

20.5.1.2 Document Access Control

The Libraries database enables SOS personnel to locate and retrieve document information. Only the librarian has the capability to add, edit, and delete. SOS personnel will have access to this database for visualization purposes via the Document Management Server.

20.5.1.3 COTS Library Reports

COTS Library inventory reports are generated as requested.

20.5.1.4 COTS Hardware and Software Procured By M&O To Be Deployed For Use On the M&O Local Area Network

Each DAAC has a non baselined hardware and software configuration, which supports their site office automation environment for non production activities. Maintenance and Operations Hardware used by the DAAC's and SMC staff to monitor, analyze, report, and manage the operational baseline. M&O provides hardware and software for each site as specified in the DID 607 & 608 ECS documents. The M&O environment is not part of the CM controlled ECS baseline. COTS software installed on the M&O network will not be maintained in the ECS COTS library but, rather, by the DAAC CM staff, who will assure that they have copies of all software that is installed on the M&O network.

Hardware or software procured for a site to be installed on the M&O LAN, will be received at the EDF and controlled under the procedures outlined in the ECS Property Management Plan and associated Project Instructions. After property is properly controlled it will be shipped to the appropriate site with a CCR showing how and where it should be installed).

20.5.1.5 On-Site COTS Document & Software Maintenance

ECS products deployed to the operational sites that has been released for operational use is maintained in the M&O Documentation and Software COTS Library maintained at each site (On-Site SW Library). Site personnel maintain partitioned libraries to facilitate access control of science software and other software not developed by ECS. Site personnel are responsible for any CM activities concerned with this library.

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21. COTS Hardware Maintenance

In this section, discussion of commercial-off-the-shelf (COTS) hardware maintenance support includes COTS hardware procured for the ECS Project and some Government furnished property (GFP).

The following documents are referenced in this section:

- Property Management Plan for the ECS Project 602-CD-001-004
- Functional and Performance Requirements Specifications, 423-41-02
- ECS Performance Assurance Implementation Plan 501-CD-001-004
- Environmental Control Plan for the ECS Project 532-CD-002-001
- Maintenance and Operations Management Plan, 601-CD-001-004
- Release 6B Operations Tool Manual for the ECS Project 609-CD-610-003
- Release B COTS Maintenance Plan for the ECS Project, 613-CD-003-001
- Release B Integrated Support Plan for the ECS Project, 616-CD-002-001
- Replacement Parts List and Spare Parts List 618-CD-002-001

21.1 COTS Hardware Maintenance - General

Overall Responsibility for the management of COTS hardware maintenance rests with the ILS Office. Daily implementation of hardware maintenance policy is the LMC's responsibility. Issues regarding COTS hardware maintenance policy are to be addressed to the ILS manager through the ILS Maintenance Coordinator, using the contact procedures found in the last sentence of this section.

COTS hardware maintenance consists of preventive and corrective maintenance. COTS hardware preventive maintenance is the responsibility of the contracted COTS hardware maintenance providers. COTS hardware corrective maintenance is the responsibility of the contracted COTS hardware maintenance providers, and/or the Local ILS Maintenance Coordinator (LMC) using local DAAC resources. The LMC is the DAAC's local point of contact for directing and coordinating corrective maintenance of ECS COTS hardware. COTS hardware maintenance support is available from the contracted COTS hardware maintenance providers according to the terms specified in each maintenance contract. Some COTS hardware is not covered under a maintenance contract. This equipment is supported with spares located on site at the DAAC, or with centralized EDF spares; or by time and materials contract support. Generally, this spare equipment consists of Monitors, Keyboards, Mice, and a variety of boards. To facilitate easy tracking of maintenance spares at each DAAC, the following method of identification will be used: in ILM, the ECSNAM for the spares will be the site name with

“MAINT” added to the end [EDCMAINT, NSIDCMAINT, etc.]. The LMC ensures that requirements of this section are complied with by all COTS hardware maintenance providers and that accurate and timely information from the DAAC is entered in the Inventory-Logistics-Maintenance (ILM) System. **Instructions on the use of ILM are in chapter 27 of this manual.** The integrated logistics support (ILS) Maintenance Coordinator is a staff position in the ILS office, which is under the Maintenance and Operations (M&O) manager’s area of responsibility. The ILS Maintenance Coordinator is available during East Coast normal work hours to provide assistance and guidance to the LMC in obtaining COTS hardware maintenance when normal efforts have been unsatisfactory. The ILS Maintenance Coordinator may be reached via the Internet, telephone, or FAX with the Internet being the preferred method. The Internet address is ilsmaint@eos.hitc.com; the telephone number is 1-800-ECS-DATA, select option #3 then dial 0727 or 4180. The FAX number is 1-301-925-0741.

21.1.1 Corrective Maintenance

Corrective maintenance is the unscheduled repair of equipment, to include fault detection, diagnosis, isolation, and resolution through line replaceable unit (LRU) repair or replacement. The maintenance of hardware items may be performed on site by the LMC or the contracted maintenance provider, or by returning the failed component to the maintenance depot for repair or replacement. COTS hardware corrective maintenance will be documented using procedures in this section and Section 8.1, Problem Management; Section 9, Configuration Management Procedures and the safety requirements of Section 21.1.4

21.1.2 Preventive Maintenance

EMASS and Storage Technology automated tape library robots are currently the only hardware requiring scheduled preventive maintenance. Preventive maintenance is performed by the original equipment manufacturer (OEM) on this equipment. OEMs are expected to coordinate preventive maintenance visits to the DAAC with the LMC. LMCs will record on the maintenance work orders (MWO) any downtime experienced as a result of preventive maintenance.

21.1.3 Configuration Management

Configuration Management (CM) requirements are addressed in Section 9 of this document. The LMC ensures compliance with the CM requirements resulting from a hardware maintenance action.

21.1.4 COTS Hardware Maintenance Safety

Hardware maintenance will be accomplished in a manner that ensures personnel and equipment are protected from harm. Guidance for establishment of safety practices, standards, and procedures is found in Section 6 of the ECS Performance Assurance Implementation Plan (PAIP), 501-CD-001-004. The LMC will ensure that these safety procedures, as well as applicable local safety requirements, are known and observed by local site support personnel or COTS hardware maintenance providers during COTS hardware maintenance.

COTS hardware safety practices include electrostatic discharge (ESD) protection. The ESD program will be locally developed by the LMC using the ECS Environmental Control Plan, 532-CD-002-001 and applicable DAAC procedures for guidance. When not being worked on or when outside protected areas, electronic parts and assemblies are to be covered by ESD protective covering or packaging. During installation or removal of electronic parts or LRUs, a common ground will be established between the technician, work area, the part, and the equipment it is to be installed in/removed from. It is the responsibility of the LMC to ensure compliance with these safety procedures by the hardware maintenance provider and site personnel.

21.2 COTS Hardware Maintenance - Contract Information

The ECS procurement organization is located at the ECS development facility (EDF) and is responsible for contracting for COTS hardware maintenance. Cost and support considerations may result in COTS HW maintenance being provided by a third party provider. Questions or comments concerning COTS hardware maintenance are to be directed to the ILS Maintenance Coordinator, who can be contacted using contact information contained in Section 21.1, COTS Hardware Maintenance - General.

21.2.1 COTS Hardware Maintenance Contract Database

Information related to COTS hardware maintenance contracts is contained in a database at the ILS Office and is used to manage maintenance contracts. The LMC can obtain extracts of maintenance contract information via the Internet on the ILS web page at <http://dmsserver.gsfc.nasa.gov/ils/intro.htm>. Information fields in the ILS web page are updated periodically by the ILS Maintenance Coordinator.

Generally, COTS hardware maintenance providers require an access, or site, code and/or the serial number of the host equipment to verify that the failed item is covered under a maintenance contract. For example, if maintenance were requested for a terminal/monitor or disk drive, the serial number of the parent workstation or server would need to be provided to the maintenance provider. The serial number may also be the access code for that provider. The information needed by the various COTS HW maintenance providers to verify that maintenance is authorized is specified on the ILS web page. DAAC site-specific site access numbers/site codes/contract numbers, if required, are also listed on the ILS web page. For some COTS HW maintenance providers, names of authorized contact persons are required. The number of authorized contact persons varies with the different maintenance providers. The ILS Maintenance Coordinator, in coordination with the LMC, arranges with the COTS HW maintenance provider for specified personnel to become an authorized contact person. It is the responsibility of the LMC to provide to the ILS Maintenance Coordinator the name changes to the authorized contact list as soon as known. The LMC will identify changes as a permanent or temporary change and, if temporary, the inclusive dates of the change. A temporary change may occur when the authorized contact person is ill, on vacation, in training, or other short-term change of work availability status has occurred or is expected to occur.

21.3 Hardware Repairs - Standard

Users/operators of ECS hardware should report hardware/system problems to the site's LMC for resolution. Users, operators, and support personnel who encounter a HW problem will report the problem according to Section 8: Problem Management. LMCs will create the MWO in ILM using procedures contained in Chapter 27. The LMC will provide timely feedback to the user/operator on the resolution of the problem. The maintenance role of the LMC includes: the following:

- (1) receiving notification of HW problems,
- (2) opening and closing the MWO,
- (3) dispatching the appropriate repair person [system administrator (SA), network administrator (NA), or vendor repair technician].
- (4) updating MWO with repair efforts in a timely manner as soon as possible following resolution the problem.
- (5) capturing, recording and reporting problems and solutions for future reference - including part numbers, serial numbers, location, and EIN number.

The ILS Maintenance Coordinator: is responsible for:

- (1) tracking MWO status,
- (2) reviewing MWO and repair actions for appropriateness and completeness
- (3) requesting missing MWO information from LMC
- (4) updating ILM based on property record actions from the MWO.
- (5) identifying support problem areas.

21.3.1 Hardware Problem Reporting

Once a failure occurs, the operator, SA and/or NA will isolate the problem to its source (i.e., Operating System, COTS application software, ECS custom software, science software, network, or COTS hardware) using the actions in Table 21.3-1, DAAC Hardware Problem Reporting Procedures.

Table 21.3-1. DAAC Hardware Problem Reporting Procedures

Step	Occurrence	Action
1	System problem discovered by an SA, NA, or operator,	<ol style="list-style-type: none">Review error message against the applicable hardware operator manual.Verify that power, network, and interface cables are connected and functioning properly.Run internal systems and/or network diagnostics.Review system logs for evidence of previously related problems or configuration changes that may be contributing to the problem.Attempt to reboot the systemIf the problem is fixed, complete a Remedy Trouble Ticket using Section 8 procedures.If the problem is not fixed, and is determined to be hardware related, either prepare an MWO or notify the LMC. The LMC will prepare an MWO with status code "O" for open and either notifies the maintenance contractor or replaces the failed component with on-site spare (if available).

21.3.2 Hardware Corrective Maintenance Actions

Hardware problems are forwarded to the LMC. The LMC will attempt to identify the cause of the problem and employ DAAC resources to resolve the problem. If unable to correct the problem using DAAC resources, the LMC arranges for on-site maintenance by the appropriate maintenance provider in accordance with Section 21.3.4, Contract On-Site Hardware Maintenance

Table 21.3-2. Hardware Corrective Maintenance Actions (1 of 2)

Step	Occurrence	Action
1	COTS HW problem not resolved by initial troubleshooting by operator, SA or NA.	<ol style="list-style-type: none">LMC contacted or notified via MWO or by operator, SA or NALMC opens MWO and adds any cross-reference information for related open Remedy Trouble Ticket (if existing)
2	LMC attempts to identify cause of problem.	<ol style="list-style-type: none">Reviews the MWO (if operator, SA or NA initiated one).Verifies actions and results to date by contacting SA and/or NA.Performs initial troubleshooting, including that described in the equipment manuals.Records result in the MWO.

Table 21.3-2. Hardware Corrective Maintenance Actions (2 of 2)

Step	Occurrence	Action
3	Problem resolved by LMC or local staff.	<ul style="list-style-type: none">a. If problem can be resolved without hardware replacement (e.g. re-seat component, cable, etc):<ul style="list-style-type: none">1) Correct problem, and verify resolution.2) Record actions taken and enter status code "A" in the MWO.b. If problem can be resolved by replacement of failed LRU with maintenance spare:<ul style="list-style-type: none">1) Replace failed LRU and record following in MWO:<ul style="list-style-type: none">a) Part number, serial number, and model/version number of replaced LRUb) Part number, serial number, and model/version number of new LRUc) Down time (elapsed hours/minutes)d) Delay time identified by reason2) CM requirements are accomplished following procedures in Section 9.3) Order replacement of failed LRU in accordance with Section 21.4.1.4) Route failed LRU in accordance with Section 21.4.2.5) LMC records actions taken to resolve the problem in the MWO6) LMC forwards completed MWO by recording status code "A"
4	Problem not resolved by LMC or local staff.	<ul style="list-style-type: none">a. LMC notifies the maintenance contractor using the information from the ILS web page, providing the telephone number of the vendor and access code needed to obtain support orb. LMC invokes return-to-depot support where appropriate,c. LMC request authorization from ILS Maintenance Coordinator for use of Time and Materials support if that is needed.d. LMC will record all the information in the MWO, to include: make, model, serial number, description of problem, and repair priority of the problem.

21.3.3 Contract On-Site Hardware Maintenance

When on-site hardware maintenance support is necessary, the LMC will notify the applicable maintenance contractor and request assistance. The call for support will be documented in the MWO by the LMC, noting the date and time the contractor was called. It is important that all vendor maintenance activities start and stop times associated with the activities are recorded in the MWO. This is the only means of measuring, and managing the maintenance vendor's contractual performance in support of the ECS system availability goals. Data fields have been specifically created in the MWO to capture this information. Refer to Table 21.3.4-1 for more information about obtaining on-site COTS hardware maintenance support.

Table 21.3.4-1. Obtaining On-Site Hardware Maintenance Support (1 of 3)

Step	Occurrence	Action
1	Local support effort did not resolve the problem.	<ul style="list-style-type: none"> a. LMC gathers information needed to obtain contract maintenance support and records it in the MWO. <ul style="list-style-type: none"> 1) Make, model, serial number, and location of failed systems. 2) Description of problem and symptoms. 3) Criticality of the COTS hardware experiencing the problem. b. Using information from the ILS web page the LMC determines: <ul style="list-style-type: none"> 1) Name of maintenance provider 2) Telephone number of the maintenance provider's technical support center 3) Access code needed to obtain support. 4) Site authorized contact person(s).
2	LMC calls the appropriate support provider's technical support center for maintenance.	<ul style="list-style-type: none"> a. Provides information from Step 1a above to the maintenance provider to establish a need for on-site support. b. Obtains a case reference number from the COTS hardware maintenance provider c. Informs the providers technician to supply a copy of dispatch trouble ticket with company name, date/time of arrival and departure, PN and SN of all equipment removed and or installed, and a narrative of problem and action taken, or d. Updates the MWO to reflect date/time of the call, all actions, and case reference
3	LMC actions	<ul style="list-style-type: none"> a. Jointly determine between maintenance contractor and site operations staff an acceptable time to bring the equipment down for maintenance [only applicable when entire device is down. Coordination to schedule down time is only required for a functional, but impaired, device] <ul style="list-style-type: none"> 1) Obtain tentative time from operations, then obtain concurrence from appropriate maintenance contractor. 2) Obtain information from the maintenance vendor such as availability window of technician and actions needing to be accomplished prior to the technicians arrival. 3) Repeat process until an agreed upon maintenance time is obtained.

Table 21.3.4-1. Obtaining On-Site Hardware Maintenance Support (2 of 3)

Step	Occurrence	Action
4	Maintenance technician arrives at the site.	<ul style="list-style-type: none"> a. LMC arranges for site access using local established procedures. b. Records arrival time in MWO.LMC request for a copy of dispatch trouble ticket with company name, date/time of arrival and departure, part number & serial number of all equipment removed and or installed and narrative of problem and action taken. c. If required, LMC requests System Administrator site Help Desk, or other appropriate and authorized personnel to shut down the machine at the predetermined time so that corrective action(s) can begin. Note that any user affected by this action must be notified prior to the machine/system shutting down. d. LMC escorts maintenance technician to the hardware e. Ensures maintenance provider's technician places LRU's on an anti-static mat when working on them. f. Ensures the maintenance provider technician places anti-static strap on wrist and connect to a common ground when handling LRU's that can be adversely effected by an electrical charge g. LMC assists the maintenance technician in resolving the problem. This includes: <ul style="list-style-type: none"> 1) Arranging for a demonstration of the problem (if possible) 2) Arranging for the equipment to be shut down. 3) Obtaining site available technical references, when needed
4a	Maintenance technician corrects the problem by replacement of parts.	<ul style="list-style-type: none"> a. If a part is replaced, the LMC accomplishes the following: <ul style="list-style-type: none"> 1) Obtains from the failed part or the maintenance technician: <ul style="list-style-type: none"> a) serial number, equipment identification number (the EIN number on the silver label), and model/version 2) Obtains from the new part: <ul style="list-style-type: none"> a) part number, serial number, and manufacturer's model number (if different from part removed, a configuration change request [CCR] is required) 3) Updates the MWO with following information: <ul style="list-style-type: none"> a) actions taken to correct the problem. b) part number, serial number, and model/version, and EIN (if applicable) of the old and new item c) name of the item replaced d) arrival date and time e) time and date corrective action started f) time and date corrective action completed g) any delay time experienced in completing the corrective action and reason for delay time to repair

Table 21.3.4-1. Obtaining On-Site Hardware Maintenance Support (3 of 3)

Step	Occurrence	Action
4b	Maintenance technician corrects the problem without replacement of parts	a. If no parts were replaced, the LMC updates the MWO with: 1) Actions taken to correct the problem. 2) Time and date technician arrived 3) Time and date repair was started and completed [these times are required to determine RMA data].
4c	LMC requests the SA to make the system functional	a. Sysadmin restores data, operating system, patches or other SW items to render the system functional. b. Annotates in the MWO that the sysadmin has been notified to restore data. c. Sysadmin notifies LMC upon completion of the requirement
4d	Maintenance technician does not resolve the problem	a. LMC request the Maintenance vendor provide additional technical and or managerial resource to resolve the problem after repair efforts have been underway for 24 hours without resolution b. LMC notifies ILS Maintenance Coordinator that problem repair effort as been delayed, and escalated. c. LMC documents all escalation activity in the MWO until further action is taken.
4e	LMC ensures	a. Receipt of a completed copy of the dispatch trouble ticket from the vendor b. The information from the vendor's ticket is consistent with the information in the MWO
5	LMC	a. Update the MWO with the following information: 1) When the call was made, and to which support provider. 2) Date and time technician made initial contact. 3) Date and time technician arrives. 4) ALDT reason and duration. 5) When repair is complete and support technician leaves. 6) Hours chargeable to hard down time and soft down time.
6	LMC reports actions taken	a. Obtains the authorization of the operation supervisor to make the change. b. Ensures the Configuration Control Board is properly notified of the configuration alterations and requests a formal change using procedures in Section 8.
7	LMC forwards	a. A completed MWO to the ILS Maintenance Coordinator via nightly updates to the SMC by changing status code on MWO to "A". b. A copy of MWO and the vendor's dispatch trouble ticket.
8	LMC files	a. A copy of vendors dispatch sheets, and related documents in a permanent file and references the MWO or files them with copy of the MWO.
9	LMC verifies	a. Property changes resulting from the MWO are recorded in subsequent updates to the property inventory report.

21.3.4 Return-to-Depot Support

In some cases the OEM does not provide on-site maintenance. [Refer to the ILS web page for details.] Instead, return-to-depot maintenance support is provided whereby an advance replacement LRU is requested from the vendor by the LMC prior to returning the failed repair. If advance replacement is not provided, then the LMC must return the failed item to the appropriate repair center using procedures contained in Section 21.4-2.

Table 21.3.5-1. Procedures for Obtaining Return to Depot Service

Step	Occurrence	Action
1	LMC contacts	a. The appropriate hardware maintenance provider, using information from the ILS WEB page (reference Section 21.2.1 COTS Hardware Maintenance Contract Database
2	LMC requests	a. Advance replacement LRU form the appropriate hardware maintenance provider with shipping instructions prior to returning the failed unit.
3	LMC annotates	a. The expected delivery time, RMA#, carrier information, and the PN, SN, EIN, and suspected problem of the failed item b. Add/move items into MWO as they become available.
4	LMC receives	a. New LRU with RMA authorization.
5	LMC packs	a. The failed LRU using the carton containing the new item following b. The instructions received with the advance replacement part.
6	LMC removes	a. The NASA Property Sticker (silver in color, also called EIN Tag Number) prior to packing the item for shipment. The sticker will be attached to the work order paperwork, and forwarded to the ILS Property Manager for accountability in ILM.
7	LMC applies	a. Address label furnished with the advance replacement to the carton.
8	LMC enters	a. In the MWO, the RMA number from the carton containing the part to be returned
9.	LMC packs	a. The box with failed item and provides a brief description of the problem.
10	LMC annotates	a. In the MWO the RMA#, date shipped to vendor, and expected receipt or return of item; as well as a description of the problem b. .In the MWO the updated inventory changes to the hardware following receipt and reinstallation of the repaired unit.
11	LMC forwards	a. The MWO to the ILS MC by entering status code "A" on the MWO.

Table 21.3.5-2. Procedure for Equipment Advance Replacement (1 of 2)**Type 1: Swap [Original LRU not returned following repair]**

Step	Occurrence	Action
1	LMC requests	a. The appropriate hardware maintenance provider, using information from the ILS WEB page (reference Section 21.2.1 COTS Hardware Maintenance Contract Database), to provide advance replacement if on-site support is not contracted.
2	LMC assures	a. MWO is annotated with failed items PN, SN, EIN, and actions as they become available.
3	LMC obtains	a. RMA number and shipping instructions from the repair vendor.
4	LMC receives	a. New advance replacement with RMA authorization.
5	LMC attaches	a. New EIN sticker on replacement LRU, and creates new item in ILM.
6	LMC installs	a. Advance replacement LRU
7	LMC packs	a. The failed LRU using the carton containing the new item following instructions received with the advance replacement part. b. Remove the NASA Property sticker (also called EIN Tag number, and silver in color) prior to packing the item for shipment.
8	LMC attaches	a. Removed EIN sticker to MWO so LRU can be properly archived.
9	LMC applies	a. Address label furnished with advance replacement to the carton.
10	LMC enters	a. RMA number to the carton containing the part to be returned (if not already entered on the address label).
11	LMC logs	a. Updated information in the MWO (cite RMA#, return address, date shipped to vendor).
12	LMC packs	a. The box(es) of the failed items, and includes a brief description of the problem.
13	LMC updates	a. The MWO status to "A" for Audit with the new information.
14	LMC forwards	a. The MWO, with the updated inventory hardware changes to the SMC.

Table 21.3.5-2. Procedure for Equipment Advance Replacement (2 of 2)**Type 2: Loaner [Original LRU repaired and returned]**

Step	Occurrence	Action
1	LMC requests	a. The appropriate hardware maintenance provider, using information from the ILS WEB page (reference Section 21.2.1 COTS Hardware Maintenance Contract Database), to provide advance replacement if on-site support is not contracted.
2	LMC assures	a. MWO is annotated with failed items PN, SN, EIN, and actions as they become available.
3	LMC obtains	a. RMA number and shipping instructions from the repair vendor.
4	LMC receives	a. New advance replacement with RMA authorization.
5	LMC installs	a. Advance replacement / Loaner LRU. Note: This LRU is NOT government property, it is only a loaner. Do NOT place an EIN sticker on this loaner.
6	LMC packs	a. The failed LRU using the carton containing the new item following instructions received with the advance replacement part. Remove the NASA Property sticker (also called EIN Tag number, and silver in color) prior to packing the item for shipment
7	LMC attaches	a. Removed EIN sticker to MWO so LRU can be properly archived. Note: Even though this LRU will be returned when fixed, the EIN will be removed. Following return a new EIN will be attached to the device, and in the note section of ILM annotate both old and new EIN for historical reference.
8	LMC applies	a. Address label furnished with advance replacement to the carton.
9	LMC enters	a. RMA number to the carton containing the part to be returned (if not already entered on the address label).
10	LMC logs	a. Updated information in the MWO (cite RMA#, return address date ship to vendor).
11	LMC packs	a. The boxes of the failed items and includes a brief description of the problem
12	LMC updates	a. The MWO status to "A" for Audit with the new information.
13	LMC forwards	a. The MWO with the updated inventory hardware changes to the SMC.
14	LMC receives	a. The repaired LRU back from the vendor. A new EIN will be attached, and annotated into ILM.
15	LMC reinstalls	a. Original LRU, and removes loaner unit for return to vendor following procedures 8-13 above for shipment of loaner

21.4 Maintenance Spares

The maintenance contractor performing the maintenance normally provides replacement LRUs. However replacement LRUs will typically be obtained from within the metropolitan area where the DAAC is located, and will seldom be stocked on the DAAC site. The ECS ILS Office may procure selected maintenance spares to provide a more rapid return to service for failed critical units and to guarantee their availability. These spares are to be used as a last resort and must be replaced quickly. The use of a spare in order to keep a system operational does NOT remove

responsibility for having the original LRU repaired. The ECS ILS Office will also procure selected spares for hardware items that do not have contracted on-site maintenance. Project spares may be centrally stocked at the EDF, stored on-site in the DAAC property room, or reside as installed spares in equipment.

Maintenance spares are procured and replenished by the ECS ILS Office using the process identified in Paragraphs 4.6.3 and 4.6.4 of Release B COTS Maintenance Plan, document 613-CD-003-001; and Section 23, Property Administration of the 611 document. Spares allocated to the DAACS will be managed at the DAAC by the LMC using guidance from the above referenced documents and appropriate local DAAC policies and procedures.

21.4.1 Use of Maintenance Spares

The LMC will control the use of on-site maintenance spares. Centrally stocked spares can be requested from the ILS Maintenance Coordinator using procedures in Section 21.1. Installation of maintenance spares is performed by the LMC (if qualified) or the COTS hardware maintenance contractor under oversight of the LMC, who ensures procedures in Section 21.3 are followed.

Table 21.4.1-1. Centrally Stocked Spares

Step	Occurrence	Action
1	LMC opens	a. An MWO to request a spare with a reason and description of the problem.
2	LMC enters	a. An "O" as OPEN in the MWO
3	LMC sends	a. An email to ILS MC
4	LMC receives	a. An email from the ILS MC authorizing the shipment of the spare from the the ILS PA b. The spare from the ILS PA, and ships the failed LRU to the ILS PA or the repair vendor as described by the ILS PA or ILS MC.
5	LMC ensures	a. Individuals installing and deinstalling the spare adhere to the Electrostatic standards by standing on an anti-static mat with anti-static wrist connection with a common ground
6	LMC prepares	a. The shipping label on the carton, clearly displaying the RMA# if required. NOTE the shipping address may differ from the maintenance contractor's main address
7	LMC updates	a. MWO with repair information, such as start, end, and delay time, PN, and SN of removed/installed items.
8	LMC ensures	a. System is returned to operational status, and notes time. System admin restores data, operating system, patches or other SW items to render the system functional.
9	LMC receives	a. The original, and now repaired, spare from the ILS PA or vendor.
10	LMC returns	a. Loaned spare to ILS PA.
11	LMC updates	a. The MWO, to include spare location, with the EIN and replacement component information such as start, end and delay time, part number and serial number of item removed/installed and forwards the MWO by entering status code "A".

21.4.2 Return of Failed LRUs

The LMC is responsible for the return of failed LRUs to maintenance contractors providing advanced replacement depot maintenance support (e.g., systems under return-to-depot support). In such agreements the maintenance provider sends to the site a replacement for a failed component under the condition that the site will return the failed component within a reasonable time, usually not greater than 10 days. If the failed component is not returned the contract is charged the full purchase price for the item not returned. Refer to Table 21.3.5-2. for return instructions.

21.5 Non-standard Hardware Support

Non-standard COTS hardware support consists of:

- a) maintenance support outside the PPM (Principal Period of Maintenance),
- b) support covered under a Time and Materials contract, or
- c) escalated support actions by the maintenance support provider.

Table 21.5-1. Procedure for Time and Material Support

Step	Occurrence	Action
1	LMC contacts	a. The ILS MC and requests Time and Material support.
2	ILS MC determines	a. If the problem is critical enough to justify Time and Material Support, and then gives the LMC verbal and written approval to use Time and Material support. Not that approval may contain a dollar limit, time limit, and/or approval reference number
3.	LMC contacts	a. The appropriate vendor for Time and Material support (refer to the ILS web page)
4	LMC monitors	a. Time and Material support costs and time for repair, then faxes or emails the information on the service calls to the ILS MC.
5	ILS MC creates	a. Quarterly reports of Time and Material support including funding used.
6	ILS briefs	a. The CCB on the T&M funds status [done quarterly].

21.5.1 Escalation of COTS Hardware Support Problem

Hardware support providers have escalation policies. These escalation policies direct increased management attention and/or resources to a problem, based on elapsed time from start of the corrective effort. The LMC may also request a support provider escalation any time the corrective effort is not progressing satisfactorily, by calling the maintenance contractor's technical support center and providing the case number generated when the problem was first reported. The LMC may request assistance from the ILS Maintenance Coordinator in obtaining a satisfactory resolution by using procedures in paragraph 21.1.

21.5.2 Low Cost Equipment – Not Repaired

Wyse terminals, keyboards, and mice are low cost items that are not repaired, because the repair costs would exceed the cost of a new item, but are replaced on a one-to-one basis from either the manufacturer or the ILS Office. Items when supported by a maintenance vendor are replaced as part of the contract. The ILS Office through spare replenishment will replace those items not covered under maintenance contract. Maintenance spares, because they are Government property, will not be disposed of without the direction of the Government. LMCs will request disposition instructions for these items from the ILS Office. They will not be discarded without specific direction from the ILS Office. The disposition request will be made by the LMC following procedures in Section 23 and Property Management Plan for the ECS Project , document 194-602-OPI-001.

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22. COTS Software Maintenance

22.1 Introduction

The ECS organization provides maintenance and operations for ECS, software, and firmware systems delivered under the ECS contract to the ECS sites. The functions performed by each of the M&O organizations are described in the M&O Management Plan, CDRL 601-CD-001-004. M&O tasks for COTS software support are described in Section 22.1, based on 613-CD-003-001, “Release B COTS Maintenance Plan for the ECS Project” and 602-CD-001-004, “Property Management Plan for the ECS Project.”

In general, ECS organizations procure, produce, deliver, and document the modifications, and enhancements made to ECS software and firmware. No custom firmware has been identified as part of the ECS program. Commercial off-the-shelf software (COTS SW), firmware, and hardware will be maintained in accordance with the COTS Maintenance Plan, CDRL 613-CD-001-001. The Project maintenance philosophy for software is to provide ECS centralized support for developed items and vendor support for COTS SW.

Specific software support procedures are discussed in this section. ECS Project software consists of COTS, custom-developed, and science software. Science software, developed for use on the ECS project, is the responsibility of the science community (see Section 22.1.3).

COTS software maintenance includes:

- License to use COTS support contract with the software vendor for; telephone assistance in resolving COTS SW problems, as well as obtaining patches and upgrades.
- Services required to produce, deliver, integrate, install, validate and document modifications of existing ECS software and firmware. [The DAAC maintenance activity includes: software configuration management (CM) including support for change control, configuration status accounting, audit activities, and software quality assurance (QA). Each site is the CM authority over its own resources subject to EOSDIS delegation of roles for ECS management.]

The site’s LMC, System Administrator (SA) and Network Administrator (NA) will be advised by the ILS Maintenance Coordinator and COTS Software License Administrator on the procedures for handling COTS software upgrades and vendor liaison.

The ECS System Support Office (SSO) provides assistance when COTS software issues exceed the capabilities of the site System Administrator or the Network Administrator to resolve.

22.1.1 COTS Software Maintenance

Operations personnel at the sites accomplish installation of patches, upgrades and software problem isolation. The COTS software vendors support COTS software procured for the ECS contract. (The term software vendor refers to the company having the legal right to authorize software use and to modify the software code.) COTS software vendor support consists of

telephone support for resolution of usage and interface problems, access to an on-line solution database, providing upgrades and patches and resolving COTS software code problems.

The Activity Outline in Table 22.1-1 is an overview of COTS Software Support procedures and the section number where details for performing the tasks can be found. .

Table 22.1-1. COTS Maintenance - Activity Outline

Task	Section
Assist System Administrator in obtaining COTS SW support	22
Manage COTS Software Maintenance Contracts	22.1.3
Manage Software Licenses	22.1.4
Interface with CCB (SW License Admin. may go before CCB whenever there is an upgrade in current software version, new patches, or a need to purchase additional software licenses in order to satisfy project requirements. SW License Admin. Should be informed and involved in any overall change to the baseline.)	22.1.4-22.1.5
Obtain COTS Software Support	22.1.6

22.1.2 Management of COTS Software Maintenance Contracts

The ECS procurement office at the EDF contracts COTS software vendor support. After the first year of warranty support, support is contracted for a period of one or more years and extended or modified as operationally required. Information related to COTS software support contracts is maintained in a database used by the COTS Software License Administrator to monitor the expiration dates and contract terms.

The COTS SW License Administrator tracks software licenses via the Inventory database. As a COTS SW vendor support requirement nears its expiration date, the COTS SW License Administrator determines through consultation with the responsible organization, the need for continued COTS software support. The SW License Administrator will issue a CCR to the CCB organization. When the CCR is approved the SW License Administrator will coordinate with the ECS procurement office for extension/modification of the support contract. Requested changes to COTS SW support contracts should be provided by the site System Administrator to the COTS SW License Administrator. The COTS SW License Administrator may be contacted by email at rcastle@eos.hitc.com or by dialing 1-800-ECS-DATA, Option #3, then dial extension 0726.

22.1.3 Management of COTS Software Licenses

Functions of the COTS SW License Administrator include the following:

- a. Maintain accountability for all COTS SW licenses procured for the ECS contract. Accountability includes tracking and reporting the as-installed location of all licenses procured. This information is generated from the findings of the software physical configuration audit. Once the software configuration audit has been performed, the software licenses will be tracked by monitoring the status of COTS SW CCRs as they are implemented and through configuration data maintained in Inventory Database.
- b. Assist the SSO organization with the help of the SE/EDS organization in impact analysis of proposed COTS SW upgrades and patches on other COTS SW applications incorporated in the ECS system design. Maintain a database containing license keys of project-purchased COTS SW. The COTS SW installation team (or site) will provide the host identifications to the COTS SW License Administrator, who will then obtain the necessary license keys from vendors for SW installation and populating the COTS SW database.
- c. The SSO organization will distribute SW upgrades, with vendor-provided release notes.
- d. Keep SSO and all other ECS sites informed by providing them with the vendor maintenance necessary to access vendor patch libraries for use in resolution of software problems. COTS software licenses vary by the type of software and the software vendors' policies.

COTS software license types include: floating, per site, specific number of concurrent users, unlimited users, and lifetime use without regard to number of users or location. The quantity and type of COTS software licenses initially required are identified to the ECS procurement office by ECS design engineers. COTS software licenses are received and entered into the Inventory Database by the ILS Property Administrator. The ILS Property Administrator maintains the master copy of COTS SW license agreements (hardcopy). The COTS Software License Administrator will update the COTS software license database.

22.1.4 COTS Software Installation and Upgrades

The COTS software upgrades are subject to appropriate CCB approval before they may be loaded on any platform. The COTS Software Librarian, using procedures contained in Section 9, "Configuration Management," notifies the SSO organization of the upgrades that have been received. The SSO distributes the COTS software upgrades as directed by the CCB. The site System Administrators are responsible for upgrading the software on the host machine and providing follow-up information to the Configuration Management Administrator (CMA), COTS Software Librarian and the COTS SW License Administrator. The site LMC will notify the appropriate personnel when the COTS software is received.

COTS software patches may be provided by the COTS software vendor in response to a DAAC's call requesting assistance in resolving a COTS software problem. The problem may or may not exist at other locations. When a COTS software patch is received directly from a COTS software vendor (this includes downloading the patch from an on-line source), the DAAC's CCB shall be informed via CCR prepared by the appropriate site personnel. It is the responsibility of the appropriate site personnel to notify the CCB of the patch's receipt, purpose, and installation

status, using procedures contained in Section 9, “Configuration Management,” and to comply with the CCB decisions. The appropriate site personnel will install the COTS SW patches as directed by the CCB. In addition to providing patches to resolve problems at a particular site, the software vendor will periodically provide upgrades of COTS software in order to improve the product. These upgrades are issued to all licenses covered by a software maintenance contract. Therefore, the COTS software upgrades will be shipped to the ILS PA who receives and enters them into inventory and then forwards the media to the COTS Software Librarian and the licenses/keys to the COTS Software License Administrator. The COTS Software License Administrator coordinates with the appropriate DAAC personnel the installed location, which includes the host name, host id and EIN number of the system. COTS SW License Administrator will update the software license database. When there is a desire to upgrade to a more current version of the software, a CCR must be submitted by the responsible Organization for approval by the appropriate CCB. Once the upgrade is approved and installed, the DAAC personnel will notify the COTS software license administrator of the configuration change. The COTS software license administrator will notify the ILS PA to update the ECS records and will update the software license database. The Configuration Management records will be updated per the as-installed status of Engineering Change Order attached with each CCR.

22.1.5 Obtaining COTS Software Support

COTS SW support involves both site capability and contracted support. The site System Administrator (SA), Network Administrator (NA), and site Software Maintenance Engineer provides site capability. The COTS SW vendor provides contracted support. When the appropriate site personnel confirms that a problem is attributed to the COTS SW, the COTS SW vendor’s technical support center is contacted by authorized personnel at the site.

The software vendor’s technical support center will verify contract support authorization and then assist in pinpointing the COTS SW problem to provide a recommended solution. The solution may comprise of a patch, work-around, or include the fix in a future release. If a patch exists to correct the problem, the patch will be identified and provided by the software vendor over the Internet or mailed to the requester. If a patch is required but unavailable, the site and vendor together determine the seriousness of the problem. In cases where the problem is critical, a temporary patch or work-around may be provided. If non-critical, the solution to the software problem may be scheduled by the software vendor to be incorporated in a future update or release. (NB: The DAAC and ESDIS CCBs must authorize the patch to be installed as a permanent installation. This decision may be made after-the-fact. That is, if the patch is needed in order to proceed with operations, notify the appropriate DAAC personnel of the requirement in accordance with Section 9, “Configuration Management.” Applicable requirements of Section 8.3, “Using the Trouble Ticket System,” must be followed.) LMC at each site will receive the software and log it appropriately in the Software Inventory.

The COTS Software License Administrator obtains the support authorization codes from the vendors and arranges for specified personnel to become an authorized contact person, based upon the limitations imposed by the vendor, and the needs of individual DAACs. The software vendor’s technical support telephone numbers, the names of personnel authorized to contact the vendor, and the authorization codes will be provided to the site’s LMC by the COTS Software

License Administrator through the M&O web site entitled “COTS Hardware- Software Maintenance” via the following URL accessible at the ECS Development Facility:

<http://dmserver.gsfc.nasa.gov/ils/html/maintsw.htm>

Changes to the information in the “COTS Software Support” web site are to be provided to the COTS Software License Administrator as they occur, for updating the web site. Specifically, the need to identify or replace the authorized contact person must be provided by the LMC to the COTS Software License Administrator.

E-mail is the preferred notification method. The site will follow these steps:

- a. Send e-mail to ilsmaint@eos.hitc.com.
- b. If e-mail is not available, call 1-800-ECS-DATA, Option 3; then dial extension 0726
- c. Identify the change as either a permanent or temporary change. A temporary change may occur when the authorized contact person is ill, on vacation, in training, or other short-term change of work availability status has occurred or is expected to occur.
- d. Provide the COTS Software License Administrator the change information as soon as it is known.

22.1.6 COTS Software Problem Reporting

The first person experiencing or observing a potential COTS SW problem will initiate a trouble ticket according to the procedures found in Section 8.3, “Using the Trouble Ticket System” then forward it to the assigned site person to review the problem. This person will attempt to isolate the source of the problem to system configuration, hardware, network, COTS SW, custom SW, or science SW.

If it is confirmed to be a COTS SW problem, the authorized contact person should contact the vendor’s technical support center for assistance. Information on contacting the software vendor’s technical support center is in Section 22.1.5, “Obtaining COTS Software Support.” The appropriate site personnel must annotate all actions inclusive of dates, time, resolutions, and comments in the Remedy Trouble Ticket as the repair progresses. COTS software corrective action reporting follows the procedures contained in Section 8, “Problem Management” and the configuration control requirements contained in Section 9, “Configuration Management,” when a configuration item is removed and/or replaced with a different version or release.

One method to troubleshooting the COTS SW problem is to scan the software vendor’s web site solutions database to learn of any solutions for similar problems. The software vendor’s web site address can be obtained as stated in Section 22.1.5. Another manner of troubleshooting the COTS SW problem is to exercise any software diagnostic routine embedded or down-loadable that will determine the status of the COTS SW on the equipment by reviewing the troubleshooting-diagnostics and corrective actions taken to date. These troubleshooting, diagnostics, and/or isolation procedures may be contained in the vendor’s operational manuals or in locally devised troubleshooting procedures.

COTS SW problems that cannot be corrected using site and contracted software support may be escalated to the ECS SSO. The SSO is staffed with Senior Systems Engineers knowledgeable on COTS SW that can assist in diagnosing the problem.

The site Local Maintenance Coordinator may go directly to the software vendor or to the ILS SW Administrator to obtain an escalation of software vendor support if the software vendor's efforts have not produced satisfactory results within a reasonable period of time. The escalation may result in increased vendor management review of the problem resolution, the assignment of additional resources to resolve the problem, and/or a more highly qualified technician assigned to resolve the software problem.

22.2 Custom Software Maintenance

Multiple baselines may exist throughout the ECS contract. The M&O organization may need to modify the configuration as established at each center. The M&O master library was delivered by the release development organization at launch. The Software Change Manager (ClearCase) provides the vehicle to store and maintain the library. The governing policies and minimum developed software component level that may be removed from or reintroduced to (checked-out for maintenance) the master library are defined by the developers' determination of code modules. This topic is detailed in the description of the Software Change Manager and Baseline Manager (XRP-II) tools, (Sections 9.6 and 9.9 of this document, respectively). Software changes are distributed on the basis of Software Configuration Items to the sites' copy of the Software Change Manager and recorded in the sites' copy of Baseline Manager following configuration management procedures defined in the M&O CM Plan (102-CD-001-002) and Section 9 of this document.

Maintenance changes to the ECS baseline may come from any of several sources, e.g.,

- ESDIS CCB directed changes
- Site-level CCB directed changes to Configuration Items (CIs)-- ESDIS will delegate or define which items are to be under site-level control and to what extent those parameters can be changed.
- Developer scheduled modifications or upgrades.
- User or operator initiated Trouble Tickets.

Trouble Tickets (TTs) are written by ECS users, operators, and system administration to address any level of problem they may encounter with a minimum required level of documentation. This topic is addressed in more detail by the ECS Developed SW Maintenance Plan (614-CD-001-002) at Section 4.3 and in this document at Section 8 "Problem Management." Most of these problems will be fixed locally with minimum overhead requirements for tracking and analysis. The TT Telecon will be used by the SEO to discuss system-level issues that may

- (a) coordinate groups of TTs,
- (b) affect more than a single site,

- (c) will be referred back to the ESDIS Project Office and the ECS development organization,
- (d) and will be worked-off with the necessary coordination and formality of multi-site change or implementation.

The Software Maintenance Engineer records all actions to resolve a problem on the associated trouble ticket within the TT System tool (Remedy). ClearCase serves as the Software Change Manager, providing utilities to maintain a software master library (the operational baseline) and supporting CM functions for version control. The Software Maintenance Engineer can check-out software components for maintenance and check them in for baselining. The Software Change Manager tracks versions of software used in builds as well as provides a tool to perform builds.

Updates to baselined custom software are submitted with the Version Description Documents (VDD) and go through the CCB review process. The software also goes through M&O testing prior to installation. All changes to the operational baseline are recorded and tracked in the Baseline Manager by the CM Administrator (see Section 9 of this document).

The Activity Checklist table that follows provides an overview of Custom Software Support procedures. Column one (**Order**) shows the order in which tasks might be accomplished. Column two (**Role**) lists the Role/Manager/Operator responsible for performing the task. Column three (**Task**) provides a brief explanation of the task. Column four (**Section**) provides the Procedure (P) section number or Instruction (I) section number where details for performing the task can be found. Column five (**Complete?**) is used as a checklist to keep track of which task steps have been completed.

Table 22.2-1. Custom Software Maintenance - Activity Checklist (1 of 2)

Order	Role	Task	Section	Complete?
1	Software Maintenance Engineer/CMA	Implementation of Modifications	(I) 22.2.1	
2	SEO	Test Plans & Procedures	(I) 22.2.2	
3	M&O Test Team	Custom SW Installation	(I) 22.2.3	
4	CCB	Scheduling the Release	(I) 22.2.3.1	
5	CMA	Operations & User Notification	(I) 22.2.3.2	
6	SW Maintenance Engineer	Maintenance Changes to the SW Change Manager (ClearCase) Library	(I) 22.2.3.3	
7	SW Maintenance Engineer	Creating SW Build Using the SW Change Manager	(I) 22.2.3.4	
8	CMA & SW Maintenance Engineer	Promoting SW Using the SW Change Manager	(I) 22.2.3.5	

Table 22.2-1. Custom Software Maintenance - Activity Checklist (2 of 2)

Order	Role	Task	Section	Complete?
9	SW Maintenance Engineer	Installing the New Release	(I) 22.2.3.6	
10	M&O Team	Obtaining SW Support	(I) 22.2.4	
11	User Services, CMA, Operators	SW Problem Reporting	(I) 22.2.4.1	
12	Problem Investigator	Troubleshooting	(I) 22.2.4.2	
13	SW Maintenance Engineer	Corrective Action Reporting	(I) 22.2.4.3	
14	Science SW Team	Resolve problems, as required	(I) 22.2.5	

22.2.1 Implementation of Modifications

Implementation of changes is performed using a controlled build procedure. For each build, each ECS organization selects a responsible engineer (RE). The SEO RE establishes the set of CCRs to be included in the system build. The ECS On-Site, SMC and EOC REs determine which, if any, site-unique extensions are to be applied to the system build. Schedules for implementation, integration, and test at the system and center levels are established. The SEO RE maintains the integrated system and center-specific CCR list and schedule.

The SEO RE maintains the Version Description Document (VDD) that contains:

- The CCRs incorporated into the build and their operational and/or user features
- The build schedule,
- ECS external interfaces affected by the build,
- ECS CIs affected by the build,
- List of ECS documentation (e.g., design documents, procedures, help files, etc.) affected by the build,
- Test program results summary, and
- Test team recommendation.

The VDD is maintained by the Sustaining Engineering Office (SEO) as described in the Developed SW Maintenance Plan, 614-CD-001-003 at Sections 4.3.6 and 4.3.7. It contains not only the as-built documentation, but is supplemented by the as-tested, verified, and accepted documentation as discussed in the Acceptance Testing Management Plan. The document is described in the System Implementation Plan for ECS Turnovers, ECS #301-CD-003-001 which addresses the overall ECS system turnover process (HW, SW, and documents). The SEO RE updates depend on authorized changes.

Appendices are added as necessary to the system level VDD by each center's RE to describe any center-unique additions/modifications to the build. The VDD is published in draft form well in advance of the build using ECS bulletin boards and electronic distribution. Updates are

published as information is gathered. The final VDD is published just prior to installation of the new build into operations.

For a given CCR, the RE (or designated team) to whom implementation of the CCR is assigned uses the configuration controlled local library to obtain the correct version of the source code/files. Using ECS-provided editors, compilers, and build procedures, the RE implements the change, performs programmer testing, and updates the documentation including design, interface, and procedure documents.

The RE may discover that the approved incorporation schedule cannot be met because of unforeseen complexity, changes in priority, or conflicting assignments. Revised implementations, priorities and schedules are brought to the CCR Telecon for discussion. If necessary, a revised CCR and/or incorporation schedule is forwarded to the ESDIS CCB for impact assessment. Typical CCR discussion topics are outlined in Figure 22.2-1.

<p><u>CCR Discussion Topics</u></p> <ul style="list-style-type: none">• Review and prioritize each CCR opened at each center• Review and re-prioritize older CCRs (as required)• Review status of open CCRs• Review distribution of CCRs by organization, status, priority and age• Recommend new/revised assignments of CCRs to organizations/centers• Discuss CCR issues with development organizations
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Figure 22.2-1. Typical CCR Telecon Agenda

Upon completion of the modification, the revised source files, data bases/ structures, and documentation are impounded and controlled by the Integration and Test organization at the RE's site using the CM tool. The impounded material is forwarded (if developed at a DAAC, the SMC or EOC) to the SEO for system integration and test. In the case of FOS SW CIs, system integration and test is performed within the EOC.

The golden copy of ECS SW is maintained by the SMC. Required access to the golden copy as well as changes will be guaranteed by logging changes and backing up modifications for later access as required by users, developers, and maintenance personnel under CM guidelines delineated by the ECS CM Plan. SW is also maintained by local CM at the DAACs.

22.2.2 Test Plans and Procedures

The objective of the test program is to ensure that the CCRs are properly implemented and that defects have not been introduced as a result of the changes. Therefore, both feature (has the CCR been properly implemented) and regression (revalidation of proper operation of the CI and system) testing at both the system and center levels are critical parts of the test program.

The test function exists within each of the M&O organizations. In the larger organizations, individuals may be dedicated to testing of M&O builds. In the smaller organizations, testing may be performed by personnel who have additional assignments. The test team can include maintenance programmers, vendors, users — any personnel who reported the problem that initiated the upgrade or who use the software. Regardless, the guiding principle is that the maintenance programmer who made a change is not allowed to be the only person who revalidates the program or provides feature testing.

The methodology employed in testing includes:

- Inspection — formal verification by examination of the assembled CI and its design documentation.
- Analysis — formal verification by examination and study of the CI/data base/data structure design and coding.
- Demonstration — formal verification by operating the computer program.
- Review of test data — review of test records and data after the execution of the computer program.

These are categories of testing procedures. The specifics cannot and should not be pre-determined, but rather should be responsive to the individual requirements determined by the extent/ impact of changes made to the original CI. M&O testing shall consist of recreating in whole or in-part the same scenarios used in the original acceptance testing.

Using the information in the Version Description Document (VDD) described in Section 22.2.1, the system and center test teams develop test plans for the build. The plans describe:

- The CCRs to be tested;
- The CM baseline(s) to be used;
- The requirements and features to be verified;
- The method of verification including identification of test cases/data sets;
- Acceptance criteria;
- Resource requirements; and
- Schedule of testing.

The plans are to be used for both feature and regression testing. Test procedures provide the detailed scenarios and test cases/data sets, steps, operator/user actions, and analyses that implement the test plan.

Feature testing is performed through either the development of new test cases and data or the modification of existing test cases and data. Regression testing is performed using standard test cases with expected test results. When possible, the same test cases and data as were used when the program was originally developed are used. Test cases developed for prior feature testing are also used as part of the test program.

When possible, center-specific testing of system-level change builds is performed in conjunction with the system test. If this is not possible, center-specific testing precedes the system-level testing to allow a controlled increase in complexity during the test program. Should center-specific modifications to the system build be required, center level testing is performed at the center first and then included in either the initial or follow-on system-level testing.

Test results and analyses which are developed by the test organization(s) are provided to the SEO and center REs. Unacceptable performance during the test program may result in delaying of the entire build or removal of a CCR from the build. Because the test team functions as an independent assessment of the build, it provides its recommendation on the quality and performance of the build to the SEO. A summary of the test program and the test team's recommendation are added to the VDD.

The SEO RE is responsible for review of the test plans and procedures to ensure the adequacy of the test program. Center REs support the SEO RE in this assessment. Status of the test program is also provided to ECS and center management at the weekly status meetings described in Appendix B of the Maintenance and Operations Management Plan.

22.2.3 Custom Software Installation

The Version Description Document (VDD) provides the summary documentation package for each build. The material in the VDD is presented by the ECS M&O test function to the appropriate individual(s) within ESDIS. The VDD material is also presented by the ECS M&O test organization to the appropriate individual(s) within each operational center. If required by ESDIS or the center, results of IV&V or center-unique testing results will be presented by the appropriate organization. Upon review and approval by ESDIS and center management, the build as baselined in the center-specific VDD is authorized for system-wide and center operations.

The following sequence then occurs:

- The VDD undergoes final updates for system and center-specific material identified by ESDIS or the operational centers (e.g., IV&V test results and recommendations, center by center operational installation schedule).
- The final VDD is published.
- In accordance with the installation schedule, the build is installed at each center along with operational and user documentation updates.
- Controlled Document updates are provided to Document Maintenance and entered into the CM system.
- The CM system is updated to indicate the M&O system and center-specific baselines.

22.2.3.1 Scheduling the Release

Scheduled maintenance should be emphasized as a method of controlling the maintenance function in which the new-release concept already applied to systems is also applied to typical

application programs. Emergency fixes are applied as required, but all other repairs or changes are assessed for the determination of an appropriate new-release schedule. There are several benefits to this approach:

- By consolidating the changes to be made to a CI, modifications can be performed more efficiently, e.g., documentation is updated only once, minimizes unnecessary disruptions to ops, decreases costs, etc.

- Since users know their changes will not be acted on immediately, they can give more consideration to which changes they actually need.

- Batched changes can be assessed holistically and more thoroughly evaluated.

- Knowing which applications will be maintained during the monthly/yearly cycle enables management to more effectively prioritize maintenance projects

- Positive control of baseline management between the M&O and Development organizations

22.2.3.2 Operations and User Notification

The Version Description Document (VDD) is the vehicle for communicating the contents, status, feature, schedule, and test results to the ECS stake holders. It is supplemented by test plans, test procedures and test results. Draft and final versions of the VDD and test program documentation are published and distributed to interested organizations internal (e.g., the ECS Development Offices, System Management Office, Quality Office, Science Office, etc.) and external (e.g., ESDIS, DAAC, other Customer, external systems, IV&V contractor, SCFs, user groups, etc.) to the ECS Contractor using ECS bulletin boards and electronic distribution.

22.2.3.3 Maintenance Changes to the On-Site SW Change Manager Library

The golden copy of ECS custom software is maintained at the SMC by the SEO CM Administrator. Required access to the golden copy as well as changes will be guaranteed by logging changes and backing up modifications for later access as required by users, developers, and maintenance personnel under CM guidelines delineated by the M&O CM Plan. Custom software will also be maintained by the CMA at the ECS deployment sites.

The Software Maintenance Engineer (SME) uses the Software Change Manager (ClearCase) to maintain the current software baseline. The CMA and SME maintain the records in Baseline Manager so that they are synchronized with the Software Change Manager maintenance changes.

SMC provides the upgraded or new custom software to the sites. Each site specifies a temporary directory (a ClearCase VOB) that will receive the software. The site CCB must approve the installation of the software into the site's master library.

When notified by the CMA that the source code has been received and baselined, the Software Maintenance Engineer creates branches in the Software Change Manager, which are created for bugfixes, enhancements, and new development that are under CM control. The Software

Maintenance Engineer also sets the configuration specification for the operational environment. Lastly, the Software Maintenance Engineer merges the files.

Refer to the procedures in ECS Work Instruction CM-1-016-1 to manage the branch and merge process.

22.2.3.4 Creating the SW Build Using SW Change Manager (ClearCase)

Refer to the procedures in ECS Work Instruction CM-1-023-1 to manage creation of the software build using ClearCase.

22.2.3.5 Promoting Software Using SW Change Manager (ClearCase)

Tables of SW states (Table 22.2-2 for ECS SW and Table 22.2-5 for Science SW); valid SW state transitions (Table 22.2-3 for ECS SW and Table 22.2-6 for Science SW); and SW promotion levels (Table 22.2-4 for ECS SW and Table 22.2-7 for Science SW) govern the promotion of ECS custom and science SW from developer or maintenance engineering activities into operational strings. SW Change Manager (ClearCase) scripts execute the transition queries, notification and changes under CM control as explained in Sections 22.2.3.5.1 and 22.2.3.5.2.

22.2.3.5.1 "Change State Script" Description

The Change State script is designed to provide configuration management support of software undergoing change. Software versions will have a state attribute assigned to facilitate the tracking of a version as it proceeds through its lifecycle stages. This script will give its user the capability to change the value of the state attribute of a file version as the version proceeds from one state to another. This script checks the entered state attribute value and allows only valid state values to be processed. It checks the user's identification and allows only designated user(s) to change the state attribute value. It checks to ensure that the entered state value is a valid transition from the file version's current state attribute's value, informs the user of unexpected transitions, and gives the user the option to proceed with the transition, anyway. It notifies appropriate personnel that the version is ready for system test, acceptance test, or production. It will also assign a state value of ready for supersession and superseded for those versions of files that are being or have been replaced. Valid state values, valid state transitions, personnel authorized to change state values, and personnel to be notified of state changes are stored in files.

22.2.3.5.2 Promotion_level Script Description

The Promotion_level script is designed to provide configuration management support of software undergoing change. Software versions will have a Promotion Level attribute assigned to facilitate the tracking of a version as it proceeds through its lifecycle stages. This script will give its user the capability to change the value of the Promotion Level attribute of a file version as the version proceeds from one promotion level to another. It checks the entered Promotion Level attribute value and allows only valid promotion level values to be processed. Maintenance, system test, acceptance test, and Production are the valid promotion level values. This script also checks the user's identification and allows only designated user(s) to change the

promotion level attribute value. It allows the designated user to promote the software version and it sets the initial state attribute value for the entered promotion level value. Valid promotion level values and personnel authorized to change these values are stored in files.

Table 22.2-2. ECS Software Oriented Tables State Table

State	Authority to Change State	Person to be Notified	In Promotion Level
In_Work	Developer		Maintenance
Ready for Inspection	Developer	Lead Engineer	Maintenance
Inspected	Lead Engineer		Maintenance
Ready for System Test	Lead Engineer	Tester	Maintenance
In Sys_Testing	Tester		System_Test
Sys_Tested	Tester		System_Test
Ready for Acceptance Test	Tester	Accept. Tester	System_Test
In_Accept_Testing	Accept. Tester		Accept_Test
Accept_Tested	Accept. Tester		Accept_Test
Ready for Release	Accept. Tester CM_Admin	CM_Admin	Accept_Test
Released	CM_Admin		Accept_Test
Ready for Production	CM_Admin	Sys_Admin	Accept_Test
In_Production	Sys_Admin		Production
Ready for Supersession	CM_Admin,		Production
Superseded	CM_Admin		

Table 22.2-3. Valid State Transitions

Current State	New State
In_Work	Ready for Inspection
Ready for Inspection	Inspected
Inspected	Ready for Sys_Test
Ready for Sys_Test	In_Sys_Testing
In_Sys_Testing	Sys_Tested
Sys_Tested	Ready for Accept_Test
Ready for Acceptance_Test	In_Acceptance_Test
In_Acceptance_Test	Acceptance_Tested
Accept_Tested	Ready for Release
Ready for Release	Released
Released	Ready for Production
Ready for Production	In_Production
In_Production	Ready for Superseding
Ready for Superseding	Superseded
Superseded	(No Transition)

Table 22.2-4. Valid State Assignment Given Current Promotion Level

Promotion Level	State
Maintenance	In_Work
Maintenance	Ready for Inspection
Maintenance	Inspected
Maintenance	Ready for System Test
Sys_Test	In_Sys_Testing
Sys_Test	Sys_Tested
Maintenance Sys_Test	Ready for Accept_Test
Accept_Test	In_Accept_Testing
Accept_Test	Accept_Tested
Accept_Test Sys_Test Maintenance	Ready for Release
Accept_Test As_Delivered	Released
As_Delivered Accept_Test Sys_Test Maintenance	Ready for Production
Production	In_Production
As_Delivered Production Accept_Test Sys_Test Maintenance	Ready for Supersession
Production	Superseded

Table 22.2-5. Science Software Oriented State Table

State	Authority to Change State	Person to be Notified	In Promotion Level
in work	SDPS/W		maintenance
ready for stand-alone test	SDPS/W	SDPS/W	maintenance
in stand-alone testing	SDPS/W		stand-alone test
stand-alone tested	SDPS/W		stand-alone test
ready for integrated test	SDPS/W	SSI&T	stand_alone test
in integrated testing	SSI&T		received by DAAC
integration tested	SSI&T		received by DAAC
ready for acceptance	SSI&T	CM_admin	received by DAAC
impounded for acceptance	CM_admin		delivered from SSI&T
ready for production	CM_admin		delivered from SSI&T
in commissioning	CM_admin		production
in full production	CM_admin		production
ready for superseding	CM_admin		production
superseded	CM_admin		production

Table 22.2-6. Science Software Oriented Valid State Transitions

Current State	New State
in work	ready for stand-alone test
ready for stand-alone test	in stand-alone testing
in stand-alone testing	stand-alone tested
stand-alone tested	ready for integrated test
ready for integrated test	in integrated testing
in integrated testing	integration tested
integration tested	ready for acceptance
ready for acceptance	impounded for acceptance
impounded for acceptance	ready for production
ready for production	in commissioning
in commissioning	in full production
in full production	ready for superseding
ready for superseding	superseded
superseded	(no transition)

Table 22.2-7. Science Software Oriented Promotion Table

Promotion Level	Authority to Promote	State
from SCF	CM_admin or SDPS/W	
maintenance	SDPS/W (checkout & checkin)	in work ready for stand-alone test in stand-alone testing ready for integrated test in integrated testing ready for acceptance ready for production
stand-alone test	SDPS/W	in stand-alone testing stand-alone tested ready for integrated test ready for acceptance ready for production
received by DAAC	SSI&T	in integrated testing integration tested ready for acceptance ready for production
delivered from SSI&T	CM_admin	impounded for acceptance ready for production
production	CM_admin	in commissioning in full production ready for supersession superseded

22.2.3.6 Installing the New Release

This procedure describes the steps that are executed to perform a SW upgrade on an ECS Host. The personnel involved are Sustaining Engineer (SE), Resource Manager (RM), Production Monitor (PM), and Host Operator (HO). The RM notifies the affected operators that there is an upgrade scheduled and the resources will be coming down for the installation activity. The RM then checks with the production monitor to begin unloading the target resources (if Autosys has already scheduled this event, it will happen automatically). The Production Monitor then checks the current load on target resources and informs the RM that the production jobs are complete. The RM then takes the initiative to shut down any processes that may still be running and begins shut-down procedures. Then by monitoring WhatsUp Gold, the RM and SE are notified that the host has gone off-line. The SE uses the install script to install the upgrade, verifies the path and directory structures, and runs all diagnostic tests. The SE then informs the RM that the installation is complete. The RM then initiates the host start-up commands. WhatsUp Gold then indicates that the host is back on line.

The assumptions underlying this procedure are as follows:

- (1) The upgrade has been previously scheduled and noted in the resource plan.

(2) The SW upgrade package was obtained from Tivoli Software Distribution including any associated install scripts/makefiles.

(3) The detailed steps for installation have been provided in the VDD accompanying the SW package.

(4) The reconfiguration to minimize impact to existing operational resources has been defined.

The following table contains detailed steps of the on-site SW installation procedure.

Table 22.2-8. Detailed Steps of SW Installation (1 of 2)

Step	Operator Action	System
1	Resource Manager composes an information message to the affected operators stating that the affected resources will be taken down as scheduled.	
2		Displays information message on consoles.
3	RM asks production monitor to verify that the production has completed on the resource as planned.	
4	PM checks current load on target resources.	Provides display of current jobs running on requested production resources.
5	PM informs RM that production jobs are complete.	
6	RM now takes control and shuts down any processes still running on impacted host(s).	
7	RM begins shut down procedures to take host off-line.	The host receives the command and goes off-line.
8		WhatsUp Gold detects the change and changes the state to "off-line."
9		WhatsUp Gold sends a status message to all of the affected operators indicating that the host has gone down and changes the corresponding icon to the down state.
10	RM receives a message from Whatsup Gold indicating that the desired host has gone off-line. All operators monitoring the host receive a message from WhatsUp Gold indicating that the designated host has gone off-line. Sustaining Engineer receives a message from WhatsUp Gold indicating that the designated host has gone off-line.	
11	RM views the change in WhatsUp Gold and notifies the Sustaining Engineer that the host is available for upgrade.	

Table 22.2-8. Detailed Steps of SW Installation (2 of 2)

Step	Operator Action	System
12	SE uses the developers' install script stored in SW Change Manager (Clearcase).	ClearCase executes the named install script which applies controlled file system changes to the specified host.
13	SE verifies that all of the paths and directories structures have been created and are correct.	Host lists its file system contents.
14	SE runs all of the diagnostic tests to verify that the new upgrade is operating as expected.	
15	SE informs the RM that the upgrade is completed	
16	RM acknowledges the message from the SE that the installation is completed.	
17	RM initiates the host start-up commands.	Host receives the commands and begins start-up.
18		Start-up completed.
19		WhatsUp Gold detects the state change and changes the icon to the up status and sends a status message to all users indicating that the host is back on-line.
20	RM, Operators, and SE receives message from WhatsUp Gold indicating that the host is back on-line.	

22.2.4 Obtaining Software Support

The Baseline Manager tool will contain the list of Responsible Engineers for the SW CIs. On-site Maintenance Engineers will consult with experts from the Sustaining Engineering Organization who perform system-level SW maintenance activities and REs who will lead troubleshooting activities of specific CIs. This point of contact information will be currently maintained in the databases. Prioritized Trouble Tickets will be used to coordinate this activity and provide emergency fixes and related Configuration Change Requests will sponsor permanent changes.

22.2.4.1 SW Problem Reporting

Anomalies, the apparent incorrect execution of an ECS CI, and inefficiencies, sub-optimal use of system resources, are documented using TTs. A TT may be submitted by users, operations, customer, analysis, maintenance and management staff. At the time of TT submittal, supporting information and data is captured by the ECS staff. SW problems will be reported via the Trouble Ticket system discussed in Section 8.

22.2.4.2 Troubleshooting

Troubleshooting will be conducted on an ad hoc basis. The site-level activity will be initiated by the Operations Supervisor assigning a Trouble Ticket to the Problem Investigator as discussed in section 8.1 The Problem Resolution Process. This process is supported by SEO Maintenance

Programmers, REs, and ECS Developers at the ECS Development Facility (EDF). The EDF will have the same SW and computer equipment variants available at the sites. They may be capable of duplicating anomalies experienced in the on-site's system to derive effective resolutions and/ or work-arounds as required until a permanent resolution is implemented.

At the TT telecon, the TT is prioritized and assigned by the Failure Review Board to an organization for work-off. A Responsible Engineer (RE) is assigned to work-off the TT. Using the captured data, a technical investigation is performed to attempt to isolate the source of the reported anomaly or inefficiency.

If the problem is caused by a non-ECS element (e.g., an interface problem with an external system, poor resource usage by a science algorithm, poor performance by a non-ECS service, etc.), the TT and supporting material is provided to the maintainer of that element. An ECS CCR may also be proposed to protect ECS from potential threats of future problems identical or similar to that documented in the TT. CCRs are discussed in detail at section 9 of this document.

If the TT is properly written against an ECS element, one or more of the following actions are taken:

- Describe the source of the problem and the recommended design/implementation change. Procedure modifications may also be appropriate.
- Modify procedures. Describe the source of the problem and modify procedures to eliminate or reduce the number of occurrences of the documented problem. Modifications may be temporary (i.e., work-arounds) or permanent. If the change is permanent, the TT can be closed and/or a User Recommendations Data Base (URDB) input generated.
- Track. The technical investigation focuses on collection of additional data from new occurrences to support additional analyses into the root of the problem and/or the frequency of occurrence. As a result of tracking, further technical investigations may result in any of the other actions.
- Re-prioritize. Describe the results of the technical investigation and recommend a priority change at the TT Telecon. A lowered priority may result in the TT going into backlog status or being closed. A higher priority may result in additional resources being applied to the technical investigation.
- Close with URDB input. The technical investigation may discover that what is being reported as a problem is actually the proper implementation of the feature based on the requirements baseline. A URDB input documents a recommended requirements change.
- Close TT into existing TT or CCR. If the TT documents a known problem for which no solution has been identified, the new TT can be closed into the existing TT. Supporting material from the new TT is added to that previously collected. The TT may also be closed into a CCR that has been previously written but not yet installed into the operational baseline.

The originator of the TT is kept informed throughout the process via minutes from the TT telecon and voice/ e-mail status reports from the RE.

22.2.4.3 Corrective Action Reporting

Trouble Tickets will be used to document SW problems as noted in Section 22.2.4.2. The results are tallied against SW Configuration Items to determine critical maintenance concerns related to frequency of occurrence, criticality level, and the volume of problems experienced. The maintainability analysis will guide critical changes, volume and type of support components to be utilized, and focus of further ECS release development.

22.2.5 Science Software

The maintenance of science software and data items provided by the Science Computing Facilities (SCFs) is not the responsibility of the ECS on-site maintenance engineers. Problem resolutions and changes to science software sponsored by the SCFs shall be introduced under the auspices of local DAAC configuration management activities and the Earth Science Data and Information System (ESDIS) (GSFC Code 505) CCB in the same manner as new releases to baselined science software. On-site changes or updates shall be integrated and tested by the Science Software Team. Ongoing CM of ECS integrated science software will be accomplished by the same tool set used for ECS developed software as explained in the Developed SW Maintenance Plan at Section 3.3 *Standardization of Support Procedures* under local DAAC control.

23. Property Management

This section describes procedures for the receipt, control, and accountability of ECS property at ECS sites. The “Property Management Plan” 602-CD-001-004 is the base document that addresses the process and policies regarding how ECS property is to be managed. The site Local Maintenance Coordinator (LMC) at each site is the site’s property administrator. LMCs should be thoroughly familiar with and adhere to the contents and policies contained within that document.

The LMCs support the activities of receiving, inspection, storage, issue, inventory recording, accounting, and reporting of ECS property at ECS sites. Generally, LMCs should follow the processes, procedures and policies specified in the Property Management Plan. Locally developed procedures should be forwarded to and reviewed by the ECS ILS Office for consistency with this plan.

23.1 Receipt of Equipment and Software from Vendor

Some equipment, software, consumables, and media will be shipped direct from vendors to the sites. In such cases, the ILS PA will fax a copy of the Purchase Order to the LMC to serve as a due-in notice. Upon receipt of the equipment, the LMC will perform a receiving inspection to verify correctness of delivery, quantity received and to determine if items were damaged during shipment. The LMC will utilize the following tables as guidance for Receipt of Incoming Items.

- Table 23.1-1 for the Receipt of Equipment
- Table 23.1-2 for the Inventory Worksheet
- Table 23.1-3 COTS Non-Conforming Product Report Checklist
- Table 23.1-4 Receiving Process Checklist

The worksheet for documenting inventory as well as the checklists can be located on the Web at <http://dmserver.gsfc.nasa.gov/forms/formindex.html> under Project forms. Inventory Worksheet form number is Mo05ja99.doc. The Property Checklists form number Mo06ja99.doc, which includes the Loading Dock Checklist, System Verification Checklist and Receiving Process Checklist. The ILS Property Administration (PA) has incorporated these two forms together as one document to reduce paperwork. When all checklists are signed and verified, the LMC will fax or email all forms to the ILS Property Administration and ILS Property Administration will update the Inventory Database. When a product is received that does not conform to the purchase order the Non-Conforming Product Report (NCR) form located at the same URL with the following form number Mo08ja99.doc can be accessed for use. **Work flow process charts A, A-1, and A-2 illustrate Receipt of Hardware/Software, Inventory Worksheet and Non-Conforming Product Reporting and can be located at the end of this chapter.**

Table 23.1-1. Procedure for the Receipt of Property

Step	Action
1.	LMC completes the Loading Dock checklist document with the following information: Printed name of receiving individual Signature of receiving individual Date of receipt Name of the carrier Shippers bill of lading or tracking number Customer reference number (when appropriate) Number of boxes received Condition of boxes with a notation of Satisfactory or Damaged
2	LMC Verifies damage, shortage, overage or other discrepancies and annotates these findings on both the carrier's and site's copy. An NCR will be completed as listed in Table 23.1-4
2a	If damages are noted obtain a signature of the carrier's representative on the shipping carrier's document and notify the ILS PA for further information
3	Begin the process of moving equipment into a controlled storage area and completing the inventory worksheet as described Table 23.1-2

Table 23.1-2. Procedure for Completion of the Inventory Worksheet

Step	Action
1.	LMC removes the equipment from the loading dock to controlled storage area.
2.	Verifies the items received against purchase orders and vendor's packing list. Inspects visual condition of material and documents information on Inventory Worksheet,
3.	Documents the serial, model numbers and other appropriate markings on the Inventory Worksheet. Performs final visual inspection of product to ensure no damage or non conforming items have been received..
	Places silver EIN tags on equipment per the instructions listed in section 23.2
5	Assembles equipment for burn-in to be performed for 72 hours and documents the burn-in process on the System Verification Checklist.
6.	If required, completes the COTS NCR using the procedure in Table 23.1-3.

**Table 23.1-3. Procedure for Completion of the
Non Conforming Product Report**

Step	Action
1	LMC verifies shipment discrepancies (include shortages, overages, and incorrect items/quantities/models.
2.	Completes COTS NCR per instructions on the back of the form
3.	Sends the completed COTS NCR to the ILS PA via fax or EMAIL
4.	ILS PA sends the NCR form to the appropriate group for vendor notification and resolution.
5.	The resolving group will communicate periodic status from the vendor to the ILS PA, who will notify the LMC.
6.	The ILS PA will receive the completed NCR from the appropriate group and files in the Property Purchase Order files. The ILS PA will send a copy of the completed NCR via fax or EMAIL to the LMC for their records.

Table 23.1-4. Receiving Process Checklist

Step	Action
1.	Verify that Loading Dock Checklist has been completed with all the appropriate information
2.	Annotate Purchase Order number or Returned Material Authorization (RMA) on the Inventory Worksheet.
3.	Verify that COTS NCR has been completed and processed, if required as in Table 23.1-3.
4.	If the material is partial receipt, verify that it is segregated, labeled, marked and in a controlled storage area
5.	If the order has a COTS NCR, verify that it is segregated, labeled and documented in a controlled storage area.
6.	Verify the Inventory Worksheet, System Verification, and Receiving Process Checklist have been completed and documented. Fax or Email to the ILS PA

23.2 Receipt of Equipment and Software from the ILS Property Administrator

The LMC will also receive equipment from the ILS PA. Table 23.2-1 defines the process of receiving equipment at the DAACS from the ILS PA and actions required. In addition the ILS PA will be the lead for the COTS NCR. The information listed in Table 23.1-3 explains the process to follow when completing a COTS NCR.

Table 23.2-1. LMC Actions for Property Received from the ILS Property Administrator

Step	Action
1.	LMC receives shipment with Installation Receipt (IR) report from the ILS PA.
2.	LMC inspects and verifies for shipping damage, completeness using the IR report.
3.	Notifies the ILS PA immediately of any discrepancies. If discrepancies exist, annotate the IR report accordingly.
4.	Sign for the property where indicated and redline location and site specific changes on the top right header information.
5.	LMC retains a copy for files and mails the original back to ILS PA
6.	The ILS PA enters the redline changes into the ILM Property Database.
7.	The original signed redlined IR report and a copy of the Installation Report will be filed in the ECS equipment folder.
8.	The site copies of the IR report and installation report will be filed in the site equipment folders
9.	The LMC will coordinate installation of the equipment in accordance with approved CCR and DAAC procedures.

23.3 Equipment Tagging

ECS equipment (e.g., contractor-acquired and GFP) that is separately identifiable and meets the criteria for controlled equipment as described in the Property Management Plan 194-602-OP1-001, will be tagged with ECS property tags. Figure 23.2-1 illustrates ECS property tags. The ILS PA prior to shipment will tag ECS equipment reserved at the EDF for staging and subsequent shipment to the sites. Tags will be placed on the equipment so that they are visible and easily accessible by bar-code scanners. Vendor-loaned and RSC capital equipment will not be tagged with ECS property tags.

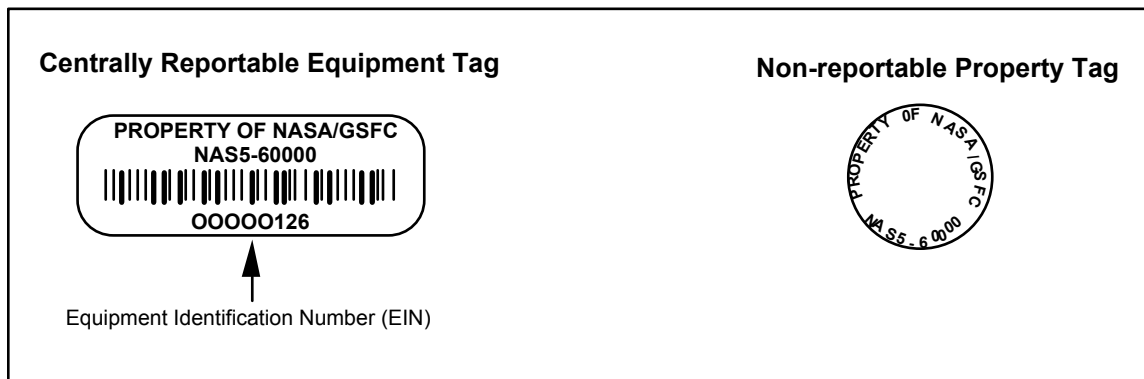


Figure 23.2-1. ECS Property Tags (actual size)

Components of major equipment that are not separately identifiable or stocked for use, such as spares/repair parts will not be assigned an EIN. Items not given an EIN sticker will be

controlled as inventory items and recorded by manufacturer, description, model/version, serial number (if applicable), location, quantity and with the parent EIN.

Property tags of loaned GFP equipment containing a NASA equipment control number (ECN) will not be removed by the LMC. At the time of receipt of such property, the ILS PA will affix an ECS property tag with EIN next to the government tag. The NASA ECN will be recorded in the property record and cross-referenced to the EIN.

Prior to disposing of ECS equipment, to include transfer to the Government, ECS property tags will be removed. Removed ECS property tags will be retained with the property turn-in document. Turn-in documents will be forwarded to the ILS PA for retention in the property records.

23.4 Property Records and Reporting

The ECS Project will use the Inventory Logistics and Maintenance (ILM) system to support the property management, control and reporting functions for contractor-acquired and GFP equipment. Property records are created and maintained in this system by the ILS PA. LMCs will be able to do queries and prepare reports using the system. Note: Instructions for the use of ILM are in Section 27 of this document.

Property records will contain a line for each item having an EIN (e.g., workstation monitor) and each of its major components (e.g., network interface cards, RAM chips, graphics card). Refer to the IR Report provided at the time of site installation. **It is the responsibility of the LMC to notify the ILS PA of inventory, configuration, and location changes so that site property records will be maintained current.** See Paragraph 23.5 for specific instructions.

23.4.1 Maintaining Property Records

LMCs will document inventory and configuration changes in local property records within one business day of the change and appropriately notify the ILS PA.

Support documentation for posting changes to property records include the following:

- **Installation Receipt Report** -- This report is provided by the installation team at the time equipment is installed and is used to record receipts and changes of equipment at the site. It can be used to update site property records with installed location, date, and name of the person accepting receipts. This report is signed by the LMC to acknowledge receipt of equipment at the site.
- **Maintenance Work Orders (MWO)** -- Prepared by the site LMC to report equipment changes resulting from maintenance or relocation actions (e.g., serial/model changes, component replacements, and relocation/reconfiguration at the site). MWOs are used by the ILS PA or the ILS Maintenance Controller to update the ILM property records.

23.4.2 Reporting Loss, Theft, Damage or Destruction

If ECS or GFP property at the site is lost or stolen, the LMC will notify the security as soon as the theft is discovered and the ILS PA within one business day. The initial written report will contain all information related to what was lost/stolen, when, where, how, and the circumstances

regarding the loss/theft. The final report, due 30 days later, will contain all information required by the ECS Property Management Plan and will be signed by the DAAC Operations Manager. If a report was prepared by local security personnel/police, a copy of the report should be attached to the report.

If equipment is damaged or destroyed through circumstances that indicate inappropriate use, negligence, or improper care, the LMC will likewise notify the ILS PA of the specifics of the damage/destruction and its circumstances via Internet as soon as known.

The ILS PA will review such incidents and report, as required, to the ECS Contracts Manager, who will notify the Government Property Administrator (e.g., DCMC) within one business day.

23.5 Equipment Relocation

This section provides instructions for equipment relocation within a DAAC (intra-site relocation); between ECS sites, and between ECS sites and non-ECS sites (inter-site relocation); to a vendor (off-site relocation); and transfer to outside the contract (external transfer).). **Work flow process charts B, B-1, and B-2 illustrate Equipment Relocation and can be located at the end of this chapter.**

23.5.1 Intra-site Relocation

Requirements for equipment reallocations within the facility or between facilities at the same site will be processed through the LMC to maintain control and accountability of equipment inventories. A Maintenance Work Order (MWO) should be used to document and forward the relocation request to the LMC. The LMC reviews the request and schedules the relocation when approved by the local management or configuration control board. When completed, the LMC will report the location change in the MWO and forward the MWO to the ILS PA by entering status code "A".

23.5.2 Inter-site Relocation

Inter-site relocation requests require a CCR approved by the ECS CCB. Such requests will identify by EIN and equipment description what is to be moved, where and when it is to be moved, and the reason for the relocation. The losing site LMC will coordinate the relocation resources and schedule with the gaining site and the ILS PA which will document the action in and MWO. Once completed, the gaining site's LMC will report completion of the relocation to the ILS PA by recording status code "A" in the MWO. The ILS PA will then update the property record with the new location and date of the action. Any loss or damage to the equipment will be reported using the procedure described in Section 23.3.3 when it occurs or is first discovered. Configuration management authorization is required prior to relocating equipment or software between DAACs.

23.5.3 External Transfers

LMCs will not transfer any ESC property to persons or organizations outside of the ECS contract. The ECS Contracting Officer is the only approving authority for such transfers. When

the ILS PA receives written authorization from the ECS Contracting Officer, transfers of ECS property to the Government or to other contracts will be accomplished. The ILS PA will provide written instructions and the necessary documentation to the LMC authorizing the property transfer.

23.6 Inventories and Audits

LMCs will complete a 100 percent physical inventory of controlled ECS property and GFP at the site at least annually and not later than July 31. Notification of the scheduled date of the inventory will be provided to the ILS PA 45 days prior to the inventory start date. ECS personnel responsible for maintaining property records will provide technical assistance but will not be part of any inventory count teams. Inventories will be designed to achieve the following objectives:

- Verify that accountable equipment is still on hand
- Confirm or determine current locations and custodial responsibility for equipment and material
- Identify unrecorded equipment which qualifies for control
- Locate or identify missing equipment.
- Identify unused or under utilized equipment and equipment or material in need of repair or rehabilitation.

The LMC will, at the time of completion of the annual inventory, forward a copy of the Inventory Reconciliation Report to the ILS PA. The Inventory Reconciliation Report will be signed by the site's ECS Manager attesting that a 100 percent inventory was conducted and that all equipment is accounted for except for those indicated as not on hand. All discrepancies will be explained.

23.7 Storage

Access to equipment and software in storage will be limited to authorized personnel and controlled by the LMC. LMCs will ensure that storage areas are kept in a clean, orderly manner. Material will be stored on shelves, in bins or drawers as appropriate, and its storage location entered into the site property record. Special storage areas or controls will be provided for items subject to corrosion, humidity, and temperature. LMC should ensure that Electrostatic Discharge (ESD) procedures are used for all items requiring ESD protection. See paragraph 23.9 for specific ESD instructions. Such items will be inspected semi-annually by the LMC. Serviceable property does not require any special color tag.

23.7.1 Segregation Requirements

Contractor-owned and vendor-loaned property will be segregated from ECS Government-owned property during storage. Unserviceable equipment will also be segregated from serviceable equipment and will be tagged. Unserviceable/reparable equipment will have a yellow tag affixed to it; unserviceable/non-reparable equipment will have a red tag affixed. Unserviceable equipment tags will indicate reason item is unserviceable, date it became unserviceable, parent EIN it came from, and signature of person declaring the item unserviceable.

23.7.2 Stock Rotation

Material designated as “stock,” such as computer tapes, cleaning tapes, CDs, labels, etc., should be used on a first-in, first-out basis. LMCs will notify the ILS PA of its consumable and media requirements at least 90 days in advance of the need date and will not have in stock greater than a 6-month supply. LMCs will consider space available for storing such material prior to placing its order with the ILS PA. Consumable items are recorded as "C" in the ‘type item’ status field of the ILM system.

23.7.3 Physical Security

ECS property will be stored in secured areas where access will be limited to authorized personnel and controlled by the LMC.

23.8 Packing and Shipping

Prior to shipping centrally reportable equipment to the EDF or other ECS sites, the LMC will notify via Email the receiving LMC of the site’s intent to ship. This will include the expected shipment date, carrier, shipping document number, estimated weight and cube, number of pieces, shipper and ship-to-address. Prior to shipment, a pre-shipment inspection will be performed to verify the following:

- Correct identification of equipment on packing lists and shipping documents including configurations, serial numbers, number of containers, and ship-to address.
- Adherence to packing, packaging and marking standards.
- Inclusion of appropriately prepared documents within shipping containers.
- LMC will notify the ILS PA via Email or phone when the item shipped has been received.

ECS property being shipped from vendors and the EDF will be shipped to the DAAC facility to the attention of the ILS Local Maintenance Coordinator. Local policy at some sites may require delivery to a site central receiving point. In such cases, written procedures will be developed between the LMC and the site’s central receiving office regarding notification of receipts, documentation required, and provisions for local delivery to the DAAC facility. The delivery of ECS equipment to site central receiving points versus direct delivery to the DAAC facility will be determined based on agreements and procedures established between the host facility and the DAAC.

23.9 Electrostatic Discharge (ESD) Program

An Awareness program on Electrostatic Discharge (ESD) and operations and maintenance practices will be followed to eliminate ESD hazards to HW, SW, or people. Procedures for the program will be developed using DOD-HDK-263 and DOD-STD-1686 as guides. Included in the program will be policies and procedures for prevention and safe dissipation of static electricity: Workplace common grounding requirements; and parts handling and protection when in storage, outside the manufacturer's protective packaging, and being readied for installation or removal and packaging for delivery. ESD hazard awareness and prevention will be an appropriate part of the training and certification process of ECS operations and maintenance

personnel. All ESD hazard awareness and prevention requirements will be passed through as requirements to all operations or maintenance subcontractors.

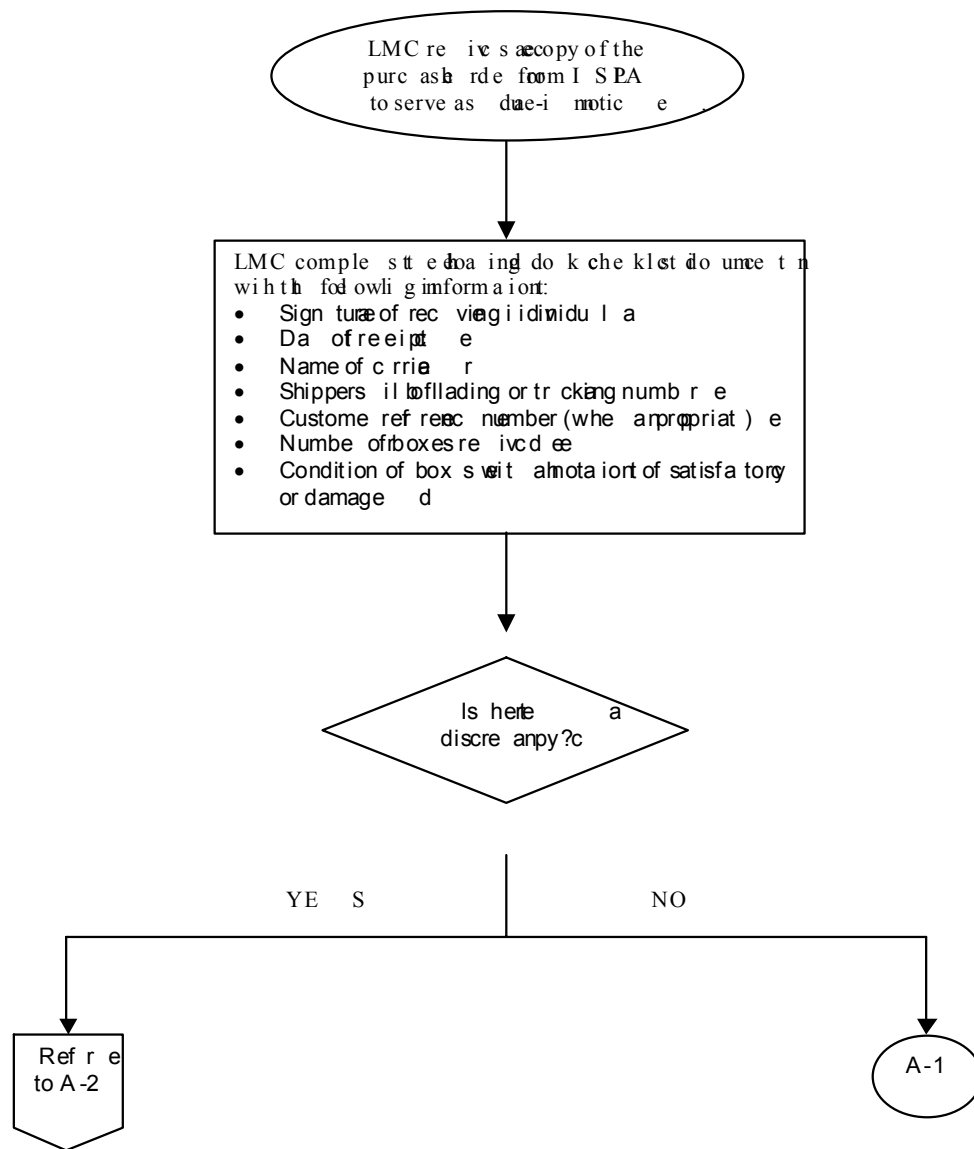


Figure 23.9-1. Receipt of Equipment and Software from Vendor

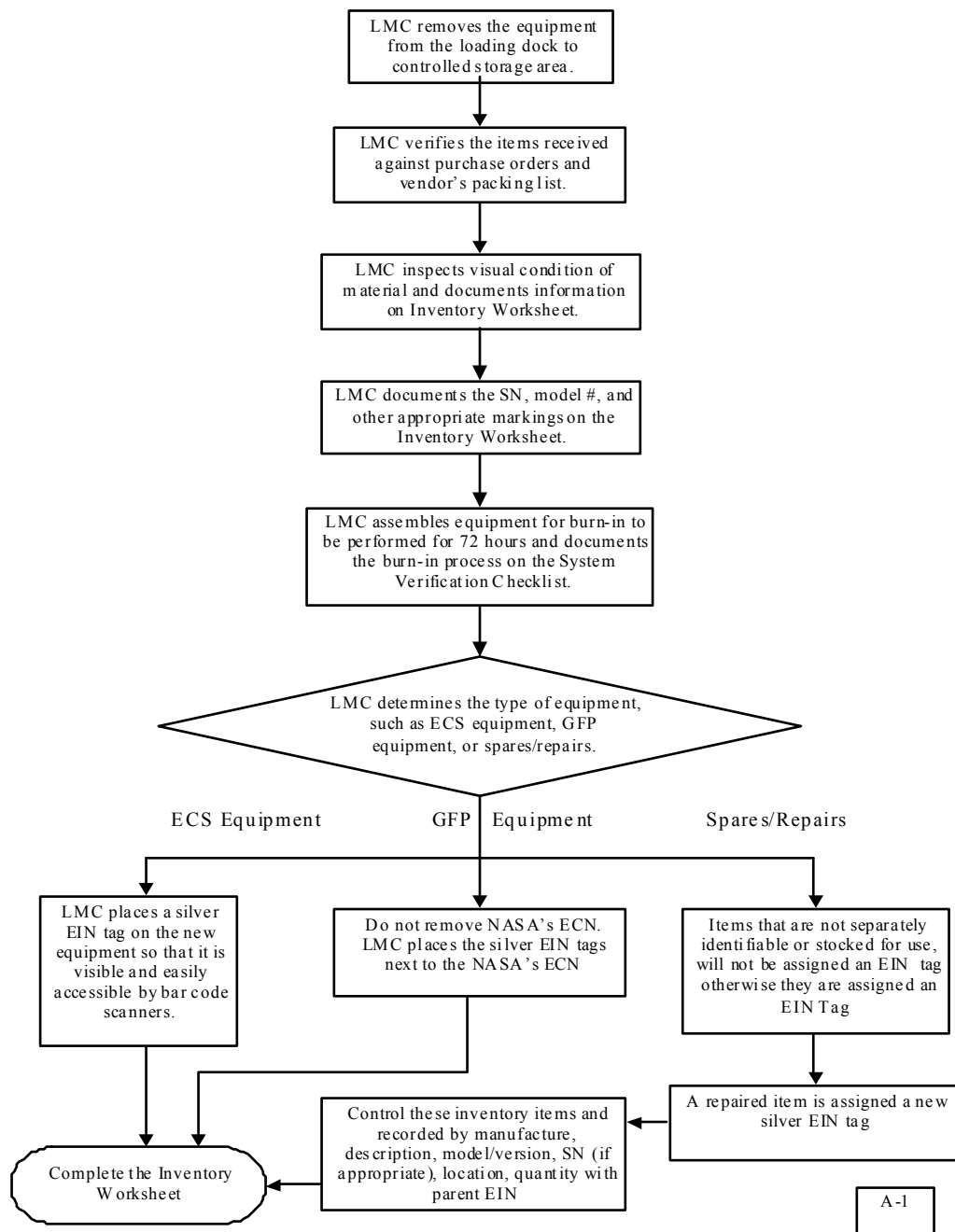
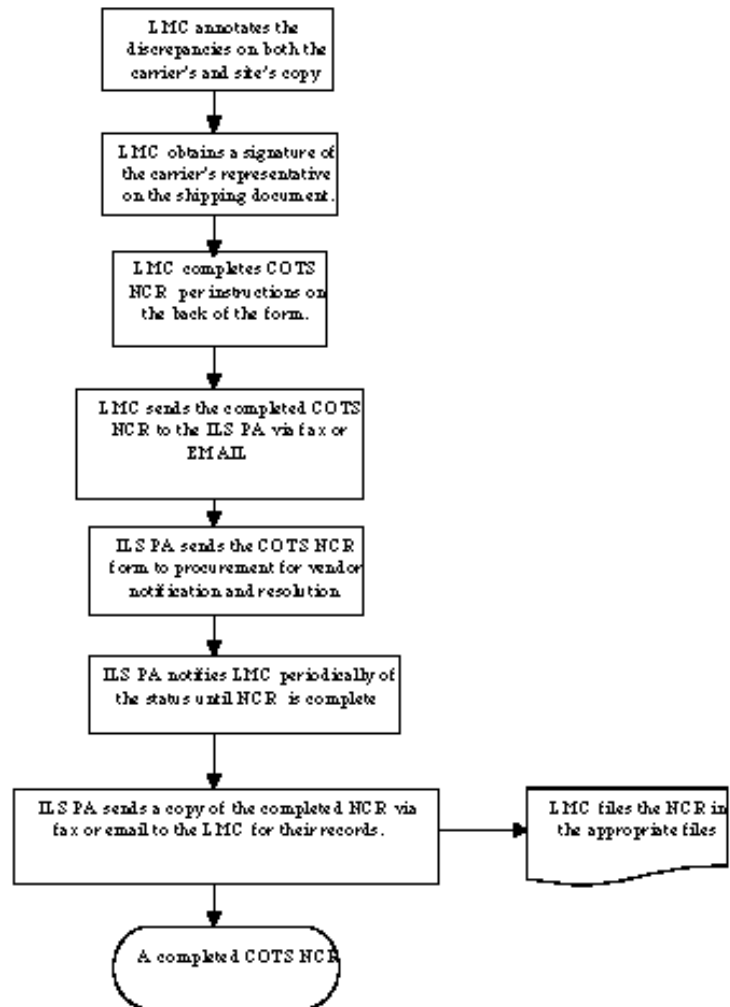


Figure 23.9-2. Procedure for Completion of the Inventory Worksheet



A-2

Figure 23.9-3. Procedure for Completion of the Non Conforming Product Report (NCR)

Equipment Relocation (1 of 3)

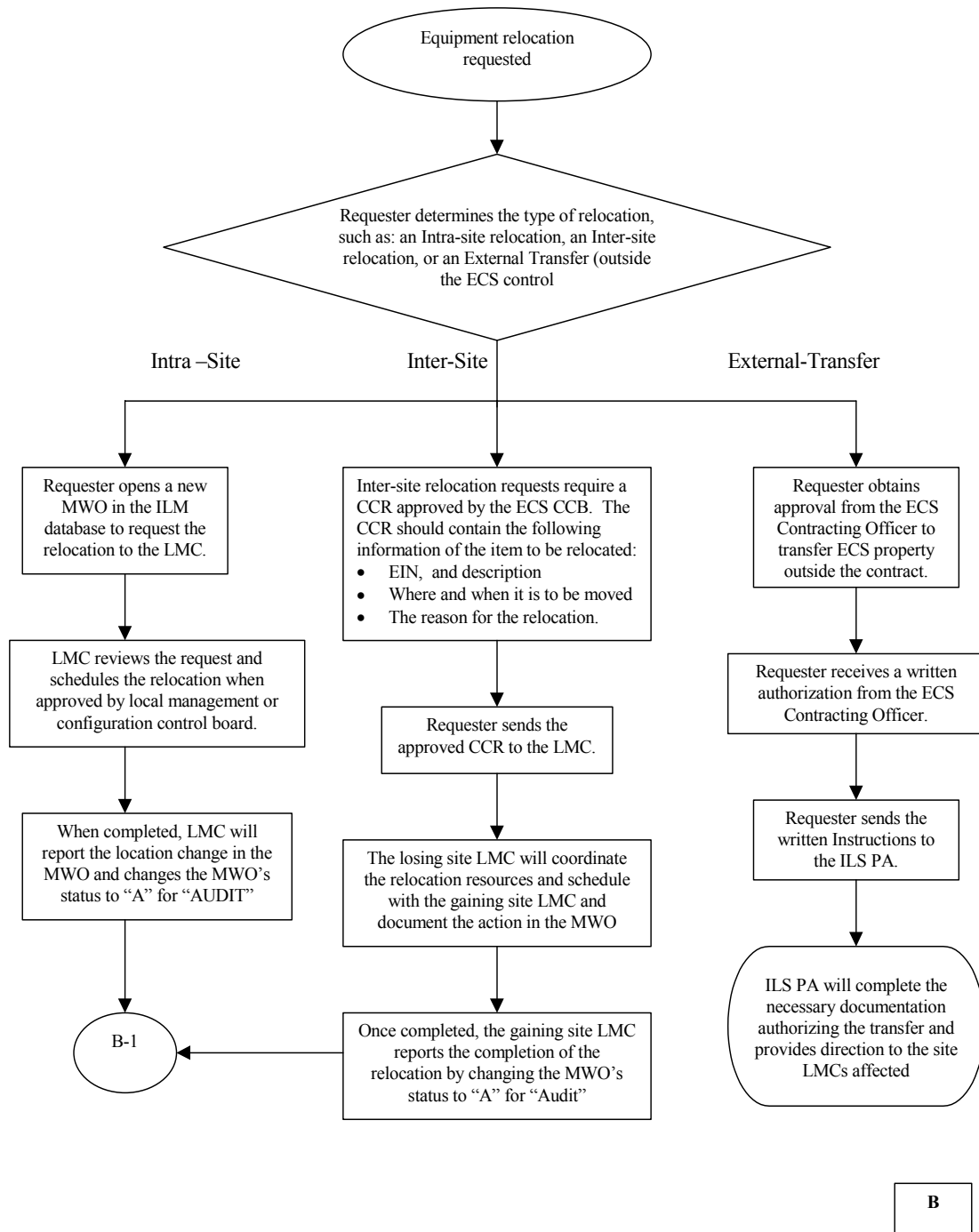
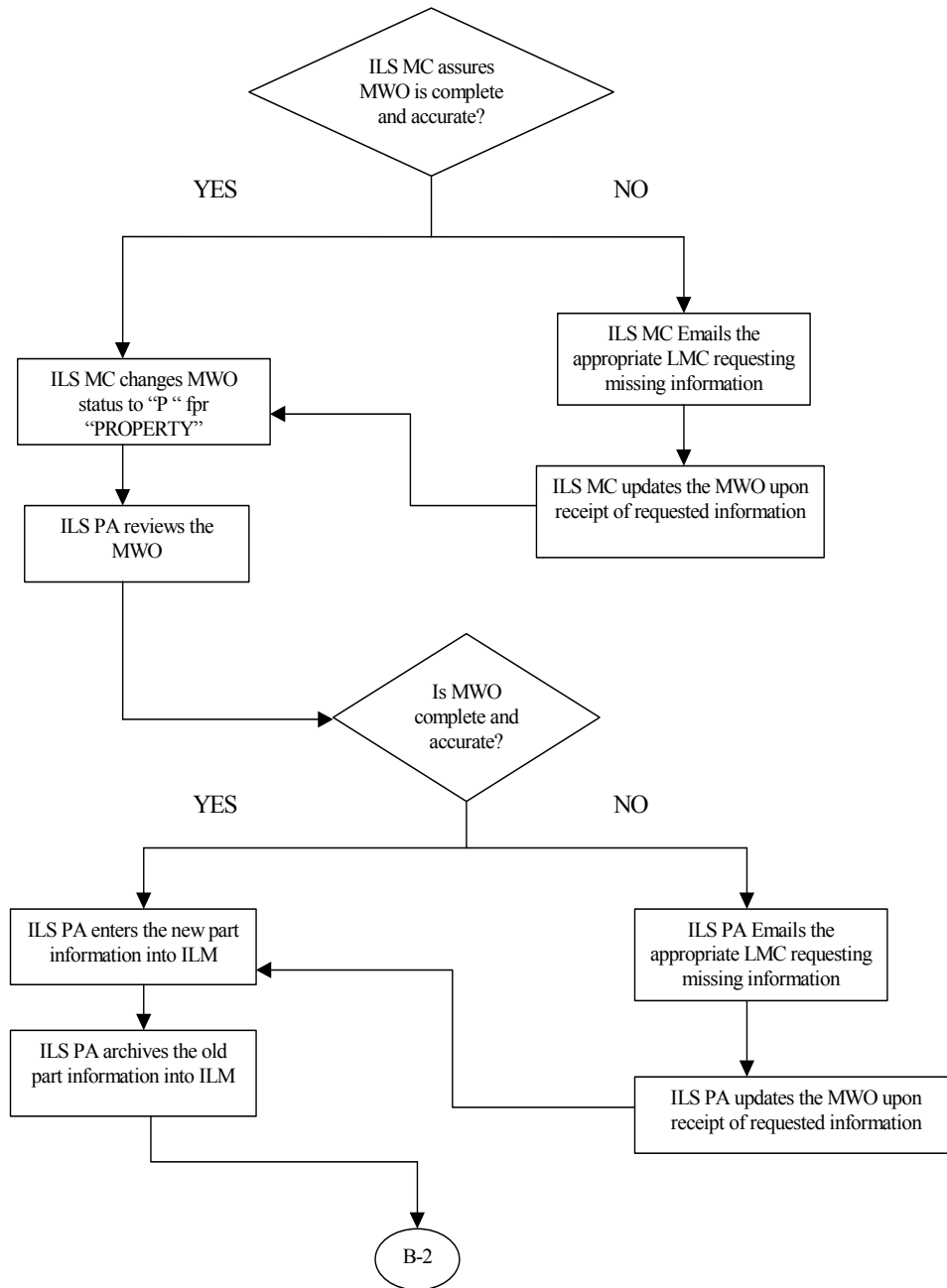


Figure 23.9-4. Equipment Relocation (1 of 3)

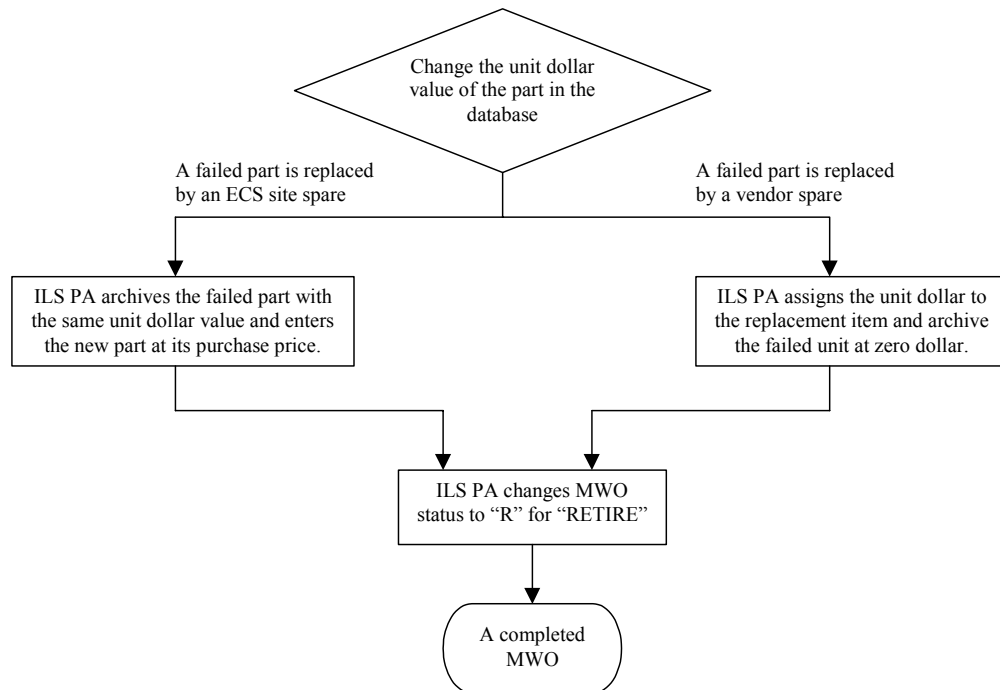
Equipment Relocation (2 of 3)



B-1

Figure 23.9-5. Equipment Relocation (2 of 3)

Equipment Relocation (3 of 3)



B-2

Figure 23.9-6. Equipment Relocation (3 of 3)

24. Installation Planning

The ECS Facilities Plans (DID 302-CD-003-001 to DID 302-CD-008-001) and the Installation Plans developed for each ECS release are the products of the facility and installation planning process. DAAC Facilities Plans are distributed 30 days after each Release Critical Design Review (CDR). These plans identify space, power, and cooling requirements based on design information available at CDR. The Installation Plans are distributed two months prior to installation of equipment at each ECS Release. As such, the Facilities Plan identifies facility preparation requirements and general installation planning that is based on final design information. The Installation Plans provide the detailed planning required by installation teams and the sites to make final preparation for installing Release equipment. Both documents are provided in draft to the DAACs for review and comment prior to publication.

24.1 Responsibilities

Installation planning and coordination is the responsibility of the ILS Installation Coordinator, who is part of the Integrated Logistics Support (ILS) Office within M&O. Using information obtained during site surveys, the Installation Coordinator prepares the Facility Plans and the Installation Plans and coordinates actions needed to prepare for and conduct the installations. DAAC M&O personnel support the Installation Coordinator by providing information to complete the Site Survey Questionnaire; reviewing the Facility Plan and the Installation Plan. They also ensure that site preparations/coordination are completed on schedule; facilitating receipt and installation of the hardware; and accepting installation of the hardware and software by signing the Installation Receipt Report. **Work flow process charts A, A-1, and A-2 illustrate Installation Planning and can be located at the end of this chapter.**

24.2 Process Description

DAAC site surveys have been previously conducted to obtain DAAC-specific information needed to begin the installation planning process. This information was documented in a Survey Questionnaire prepared for each DAAC and is used in the preparation of the Facility Plans and the Installation Plans. This information, plus design and equipment specifications, is used to prepare the Facilities Plans, which project facility requirements and provide a preliminary plan for the placement of systems within the DAACs. DAACs review this information and provide requested changes, which are considered in the preparation of the Installation Plans.

Two months prior to the installation of hardware, a detailed Installation Plan is produced to identify the planned placement of hardware in the facility and how the hardware will be configured and networked, and to identify site preparations necessary to support the installation. Installation teams use the Installation Plan to install the systems and networks. After the equipment is installed and tested, the installation team leader obtains the DAAC Manager's signature on the Installation Receipt Reports, which details the locations and equipment that have been installed and networked. Within three weeks following the installation, the Installations Coordinator will update the facility diagrams and network diagram to reflect the as-

installed configuration at the site. These diagrams are submitted to the ECS CCB and, when approved, becomes part of the operations baseline for the site and are available for viewing on the web. The baselined diagrams are provided to the site in the “As-Built” document provided to the DAAC shortly after the installation of hardware has been completed. It is the responsibility of the LMC to notify the Installation Coordinator as changes to the baseline documentation occur.

Table 24.1-1. Installation Planning Activity Outline

Step	Responsible Person	ACTION
1	Installation Coordinator	Receive a copy of installation survey
2	Installation Coordinator	Contact vendors, define and arrange load to be delivered to installation site
3	Installation Coordinator	Briefing with DAAC SE and coordinate schedule
4	Installation Team	Install hardware based on Installation schedule
5.	Installation Team	Test equipment
6	Installation Coordinator	Update Installation plan with revisions
7	Installation Team	Test connectivity of all devices by Pinging
8	Installation Coordinator	Update information to the plan and create a As-Built document consisting of SCSI Cable Management Schemme, Floor Plan, VCATS Hardware Report, LAN Cable Management Scheme, Network diagram and the Hardware Diagram
9	Installation Coordinator	Sends the As-Built document to DAAC Liaison while creating a CCR for the CCB
10	DAAC	The DAAC Liaison should provide any changes, deletions or addition to the As-Built document as quickly as possible.
11	Installation Coordinator	will revise and submit the CCR to the CCB
12	Installation Coordinator	Incorporate changes from CCB
13	Installation Coordinator	Send publication to Web Document Control Group

24.3 Maintenance of Facility and Hardware Diagrams

Facility and hardware diagrams reflect the as-installed configuration. The baseline version of these diagrams is maintained by the ILS Installations Coordinator. As changes to these diagrams occur (e.g., relocation of equipment within the site, additions/deletions to the LAN), the LMC will inform the ILS Installations Coordinator by redlining the diagrams. The Installations Coordinator will update the Computer Aided Drawing (CAD) system to reflect the change(s) and provide an updated facility drawing to the site’s LMC. The Installation Coordinator will create a CCR and present the changed documents to the CCB for approval to change the baselined document.

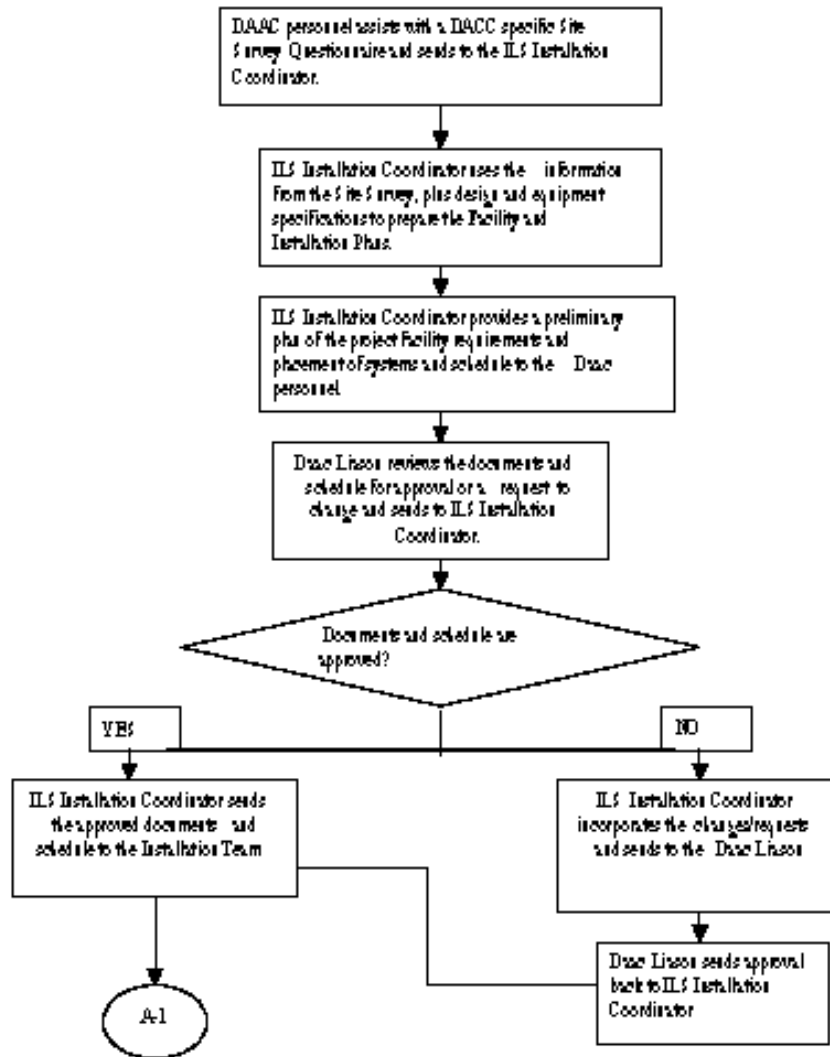
24.4 Maintenance of LAN Cable Management Scheme

Within three weeks of the completed hardware installation, a LAN Cable Management Scheme is supplied to the DAAC LMC by the ILS Installations Coordinator. This matrix will identify the cable number, type, length, decibel loss rating, and location of cables installed; and will identify the IP addresses of the equipment connected by the cables. The LMC will update this matrix as LAN changes occur and send the changes to the Installations Coordinator. The Installation Coordinator will create a CCR and present the changed documents to the CCB for approval to change the baselined documents.

24.5 Maintenance of SCSI Cable Management Scheme

Within three weeks of the completed hardware installation, a SCSI Cable Management Scheme is supplied to the DAAC LMC by the ECS Installations Coordinator. This matrix will identify the cable number, length, location of cables installed; and will identify the equipment connected to the cables. The LMC will update this matrix as LAN changes occur and send the changes to the Installations Coordinator. The Installation Coordinator will create a CCR and present the changed documents to the CCB for approval to change the baselined documents.

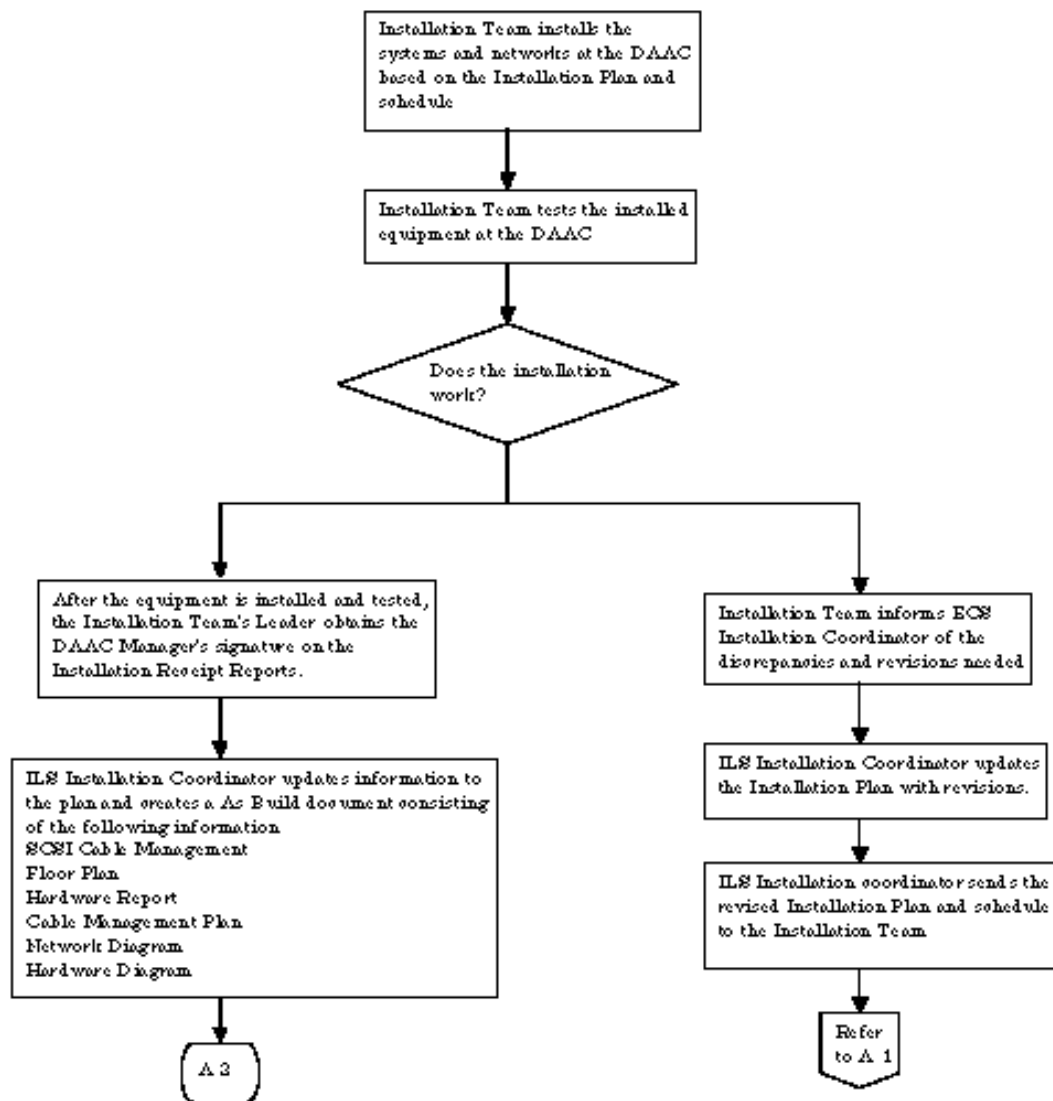
Installation Process (1 of 3)



A

Figure 24.5-1. Installation Process (1 of 3)

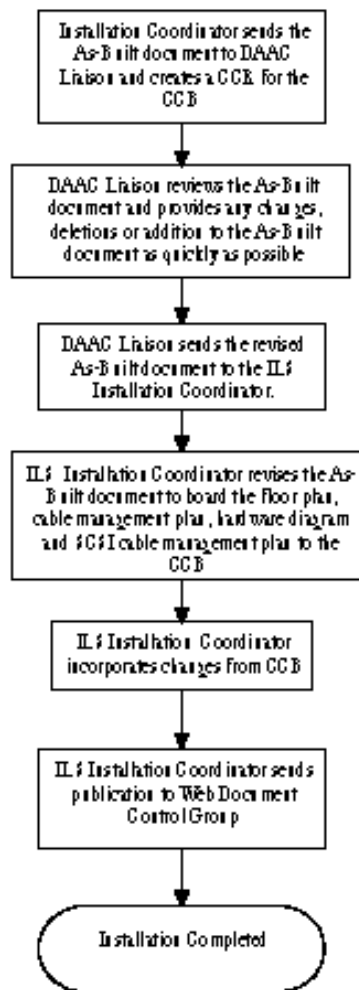
Installation Process (2 of 3)



A-1

Figure 24.5-1. Installation Process (2 of 3)

Installation Process (3 of 3)



A-2

Figure 24.5-1. Installation Process (3 of 3)

25. COTS Training

The procedures to request COTS training have been developed based on these sources: DID 622-CD-001-005 ECS Training Plan, DID 611-CD-611-002 ECS Mission Operations Procedures, M&O Certification Plan 626-CD-100-001, Section 3, 4 of the ECS M&O Position Description DID 607-CD-001-002. The ECS System Support Office (SSO) Operations Trainer arranges for COTS training by working with the COTS Training Coordinator, the ILS Manager, as well as the potential students.

The Activity Checklist in Table 25.1-1 outlines the role of the COTS Training Coordinator and the section number where details for performing the tasks can be found.

Table 25.1-1. COTS Training - Activity Checklist

Task	Section
DAAC's SMC, SSO, ILS, and ECS Development submit requests for COTS Training	25.1
Forward request to ILS Manager	25.2
Arrange for equipment and classroom space	25.2
Ensure that initial registration will be filled or arrange for cancellation without penalty	25.3
Maintain COTS training records	25.4
Monitor DAAC COTS training budget	25.5

25.1 Requesting COTS Training

The COTS Training Coordinator must request training to initiate the following procedures **at least 30 days prior** to the desired training date. The procedures are accomplished in the following order:

- a. The COTS Training Coordinator requests training using COTS Training Request Format via cc:mail to the ECS (SSO) Operations Trainer, the COTS Training Request Format must include the following information:
 - Student(s) name and DAAC representation
 - Training need
 - COTS course requested
 - Dates preferred
 - Price of COTS course
 - Manager approving purchase of training
 - Course location
 - Duration of course

- b. EDS (SSO) Operations Trainer) verifies that the training request meets the following criteria:
 - Relates to an ECS M&O function
 - Relates to COTS product in the ECS system design
 - Is cost effective and within budget constraints
- c. COTS Training Coordinator determines the proposed training details, including the following:
 - Training vendor
 - Individual or group training, based on cost effectiveness
 - On-site or off-site class location
 - Available vendor training dates
- d. (All COTS training must be approved by both the ECS (SSO) Operations Trainer and the ILS Manager prior to procurement.) COTS Training Coordinator forwards the training request to the ECS (SSO) Operations Trainer for approval, once approved by the ECS (SSO) Operations Trainer, it is then forwarded to the ILS Manager. The ILS Manager will either approve or deny the request.
- e. COTS Training Coordinator maintains record of approval of training purchase.

25.2 Coordinating COTS Training

If the ILS Manager approves the request for COTS training, the COTS Training Coordinator will provide all vendor training details to the COTS Purchasing Manager. The COTS Purchasing Manager produces the purchase order and provides a copy to the COTS Training Coordinator, who will then order the training from the vendor. The procedures to coordinate training are accomplished in the following order:

- a. When approved, the COTS Training Coordinator submits all training details to the COTS Purchasing Manager.
- b. The COTS Training Coordinator orders training from the vendor.
- c. Purchasing Manager processes the purchase order and provides a copy to the COTS Training Coordinator.
- d. The COTS Training Coordinator forwards the purchase order to the vendor to reserve training.
- e. The COTS Training Coordinator generates a notice to students that includes training vendor, course, date(s), other relevant information.
- f. For on-site training, COTS Training Coordinator makes necessary arrangements for classroom space and equipment configuration; coordinates use of any operational equipment required for course, with on-going operations; forwards site location details to vendor instructor.
- g. Students attend training.

- h. Prior to Group COTS training, the COTS Training Coordinator provides students with a COTS Training Evaluation Form, which evaluates the effectiveness of the course. In cases when COTS training is found to be substandard or ineffective, the COTS Training Coordinator contacts the ECS (SSO) Operations Trainer, ILS Manager, and the DAAC or site manager, together they come to a consensus as to whether or not to pursue compensation for the training.
- i. Depending upon the decision rendered, the COTS Training Coordinator seeks refund, replacement training seat, or training credit from the vendor.
- j. The COTS Training Coordinator maintains training records for the DAACs, SMC, SEO, ILS and ECS Development in accordance with DIDs 622 and 525. Required record fields include: price, student name, vendor name, course name and number, course dates, and location.
- k. The (COTS Training Coordinator) will forward a copy of the training record to the ECS (SSO) Operations Trainer in format specified by DID 622.

25.3 Canceling/Rescheduling COTS Training

COTS training vendors generally withhold all or part of registration fees for course seats canceled too close to the start date of training. The deadline for cancellation without penalty varies between vendors, **but the maximum deadline is three weeks prior to course start date.** In order to preserve ECS COTS training funds, any cancellations of COTS training by ECS personnel must be made before three weeks of the start date to avoid these financial penalties.

- If student(s) need to cancel within this three-week deadline, the (DAAC or site manager) will be responsible for substituting an equally qualified individual to attend the course, and for notifying the COTS Training Coordinator to ensure proper record keeping and registration with the vendor.

25.4 Maintenance of COTS Training Records

The (COTS Training Coordinator) will maintain records of all training accomplished as specified in Training Plan DID-622-CD-001-005. COTS training records are maintained by the COTS Training Coordinator which monitors the allocation of funds and reports back to ECS (SSO) Operations Trainer to adjust the budget. The COTS Training Coordinator will submit training record information to the ECS (SSO) Operations Trainer for DID 625-CD-001-001 as specified in the Training Plan DID 622-CD-001-005.

25.5 Contractor COTS Training Funds Accounting

COTS training funds will be allocated to each ECS M&O organization, based upon staffing levels and functions performed at the site. The COTS Training Coordinator maintains the training budget spreadsheets for each of the DAAC's, SMC, SEO, ILS and ECS M&O Development Facility. The COTS Training Coordinator updates the spreadsheets as training is

complete and submits quarterly balance reports to the ECS (SSO) Operations Trainer for planning purposes.

While the coordination and purchasing responsibilities for COTS training fall primarily with the ECS COTS Training Coordinator, the ECS (SSO) Operations Trainer will be responsible to the M&O organization for spending the allocated COTS training budget judiciously.

Travel funds are not included in the COTS training budget. These must be secured from the organization to which each student belongs.